

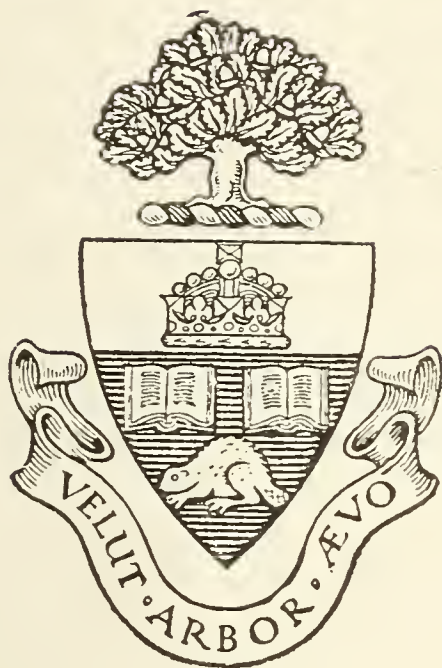
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UNIVERSITY OF TORONTO

Faculty
of

Medicine



REPORT OF THE DEAN
OF THE
FACULTY OF MEDICINE

Session 1947-1948



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Report of the Dean of the Faculty of Medicine

At this, the end of another academic year, and with three years having elapsed since the cessation of hostilities, it is interesting to survey the progress and position of the Faculty of Medicine. A medical school should have as its primary duty the qualification and training of a group of students who will go out to serve in the fullest sense the health needs of the nation. It should also serve as a centre to which doctors may return to refresh their knowledge—a place where special fields of medicine may be explored, modern techniques acquired, and finally a centre where research in the many unsolved problems of medicine may be fostered and encouraged.

Undergraduate teaching. 132 students qualified in June for the degree of M.D. and in the autumn of 1947 150 new students were admitted to the first premedical year. In the intervening years the numbers vary from 140 to 200. The curriculum as it now stands consists of two years following senior matriculation in premedical education and four years in purely professional training. A certain number of students are admitted to the first medical year who have completed an arts or science degree in lieu of the regularly prescribed premedical training.

After a good deal of study and deliberation it has been decided to reduce the teaching session in the medical years from 36 to 32 weeks. It is recognized that in order to acquire modern training in the specialties several years must be spent in graduate work. Consequently stress should be placed during the undergraduate years on principles rather than on details of treatment. A new series of lectures on applied anatomy given from the standpoint of the clinician will, it is hoped, serve as a suitable introduction to bedside teaching in surgery. In a like manner the course in physiology is correlated with the introduction to bedside teaching in medicine. Another group of lectures will be given for the first time next year entitled "Humanistic and Scientific Values in Medicine." It may well be argued that there has been too much alteration in methods and content of the curriculum in the last few years. Medicine, however, is anything but a static study and those who are interested in its teaching and in its place in the social life of the nation must of necessity have constantly under review the methods of teaching and content of the curriculum.

Graduate teaching. Graduate training has assumed an important place in the school since the war. Upwards of 100 students are enrolled in various courses which combine clinical training in the university group of hospitals with the necessary training in the basic sciences. In the past year plans were completed for a graduate course in anaesthesiology extending over three years. The new director of the Department of Psychiatry has made excellent progress with plans for the training of specialists in that particular field. It is hoped that with the announcement of increased federal aid to mental health programmes in the provinces, some of the difficulties in the way of fulfilment of his plans may be removed. In this field there is, and must continue to be, close co-operation between the university and the local department of health. Psychiatric training demands modern hospital and out-patient accommodation and a close affiliation with the training facilities in the large general hospitals. Professor Stokes during his first year in Toronto has laid firm foundations for a first-class training centre and if his efforts gain the support they deserve, not only the province but the entire Dominion of Canada will stand to gain the benefits in this tremendously important field of mental health. The newly organized courses in ophthalmology and oto-laryngology are on a firm basis and the limited number of places available attract candidates from all the provinces.

In the past year certain specialized short courses were offered to limited numbers of candidates. The advanced refresher courses in medicine and surgery, given in the autumn of 1947, were attended by some 40 students. The course is offered again this autumn with obstetrics and gynaecology added. Already the quota has been filled and it is gratifying to see applications from all the provinces in Canada

and a fair number from the United States. A special course for specialists in ophthalmology and oto-laryngology was offered in January 1948 and was well attended and received. This course will also be repeated in January of 1949. In the autumn of 1947 a three day course for general practitioners was advertised and sponsored by our Alumni Association. So many doctors arrived for this session that it became necessary to move the lectures from the General Hospital to the newly-opened Sunnybrook Hospital. Here, thanks to the co-operation of the Department of Veterans Affairs, we had the facilities of one of the best lecture theatres on the continent. The attendance for this meeting reached 500 and, judging from the comments of many present, the lectures and clinics were received with approval. It is proposed to repeat this course for general practitioners in November of this year. A further course for general practitioners of one week's duration will be given by the staff of St. Michael's Hospital early in 1949, but will be limited to 100 applicants.

During the past three years the Medical Alumni Association has taken an increasing interest in the affairs of the Faculty of Medicine. This has been evidenced by the number of bursaries and scholarships for which they are responsible, and by a very close co-operation in the arranging of certain graduate courses for general practitioners. The Faculty is keenly appreciative of the work and interest of the graduate association. Not the least of their activities is an annual dinner tendered on the eve of graduation to the students of the final year. On this occasion the alumni are hosts to the members of the graduating class as well as the graduates of 50 years ago. The 1948 dinner was held in the same week as the meeting of the Canadian Medical Association. There was a very large attendance of members of the alumni from all over Canada as well as many of the Faculty. Mr. Leonard W. Brockington gave a most inspiring address.

Another feature sponsored by the Alumni is worthy of note. During the winter term they arranged, with the co-operation of the Faculty, a meeting of the final year students to which were invited six representative members of the profession from various parts of the province. This provided a most interesting and instructive session. It was conducted in the manner of a round table conference and the students for two hours asked questions about various aspects of practice. Dr. Stock who acted as chairman and the representatives of the profession who contributed to the discussion are to be commended on the brilliant way in which they handled the evening's discussion.

Research. No particular reference will be made here to the many fields in which research is being carried on in the Faculty of Medicine and its allied institutions. A full record will be noted under the reports of the various departments. It is supported not only by departmental and university research funds but by many outside agencies, notably the National Research Council, the Canadian and Ontario Cancer Institutes and certain other trust funds. A general committee of the Faculty has been formed to undertake and supervise clinical research with certain radio-active therapeutic agents shortly to be available from the Chalk River project and supplied through the National Research Council. Research with tracer substances, of particular value in the study of cell metabolism, has of course been in progress for the past year. Research represents a steadily increasing item in the annual budget. It is not only a question of further expenditure for personnel, but of steadily mounting costs in apparatus and greater laboratory space. The Board of Governors has authorized the building of a new structure beside the Banting Institute which will be known as the Charles Best building. It will house the Department of Physiology and give additional facilities and space for the Department of Medical Research. The vacating of space in the old medical building will allow for expansion in the presently crowded laboratories of Pharmacology and Biochemistry. It is hoped that funds will shortly be available to begin work on the new building.

Many distinguished scholars from abroad have visited the school during the year. Professor Trueta of Oxford and Spain delivered the Balfour Lecture to a very large audience in Convocation Hall on December 1. Professor Bernardo Houssay

of Buenos Aires gave the Banting Memorial Lecture on February 5. Sir William Fletcher Shaw of Manchester gave the address at the Convocation for medical students on June 27. Other visitors included Sir Ernest Rock Carling, Sir Henry Dale and Lord Horder of England, Dr. Paul A. Chandler of Boston, Dr. Paul H. Holinger of Chicago, Dr. Valto Klemola of Finland, Dr. Jose Estable of Montevideo, Dr. David Ordman of Johannesburg and Dr. Pickles of Yorkshire, England. Several of the visitors found time to address the final year students, bringing to the undergraduate the stimulus of distinguished scholarship from the great medical centres of the world.

During the year Professor William Boyd was honoured by the University of Manitoba by the conferment of an Honorary D.Sc. Dr. Gallie, Professor Emeritus, was the recipient of the Honorary Medal of the Royal College of Surgeons of England, and in May 1948 he was given an Honorary D.Sc. from McGill University. In June he delivered the Lister Lecture at the General Session of the Canadian Medical Association in Toronto. Professor Janes was made an Honorary Member of the newly-formed British Columbia Surgical Society and acted as guest speaker at their meeting in Vancouver in March.

Dr. H. J. Shields was appointed President of the Canadian Society of Anaesthetists. Dr. A. B. Stokes was appointed McGhie Memorial Lecturer at the University of Western Ontario. Dr. Ruth Franks became a Fellow of the Royal Society of Arts. Professor J. K. W. Ferguson was elected a Fellow of the Royal Society of Canada. Dr. F. F. Tisdall received the Honorary F.R.C.P degree from the Royal College of Physicians in London.

Dr. J. A. Sullivan was elected a Fellow of the American Otological Society. Professor P. E. Ireland was elected a Fellow of the American Otological Society and a Fellow of the American Laryngological, Rhinological and Otological Society. Drs. D. M. Low, W. A. Dafoe, John R. McArthur and R. B. Meiklejohn received the degree of F.R.C.O.G.

The degree of Doctor of Medicine (*honoris causa*) was conferred on Professor C. H. Best by the Universities of Louvain and Liege, and the degree of Doctor of Science (*honoris causa*) by the University of Oxford. Professor Best also received the Medal of Freedom, University of Brussels, Medal of the University of Louvain and the Medal of Honour of the Canadian Pharmaceutical Manufacturers' Association. He became President of the Toronto Diabetes Association and Foreign Honorary Member of the American Academy of Arts and Sciences.

The rank of Associate Professor has been re-established in several of the clinical departments and the terms "Senior" and "Junior Demonstrator" have been replaced by that of "Clinical Teacher." The establishment of the rank of Associate Professor for senior clinicians allows for the promotion to Faculty rank of many able and experienced younger men. Their services will be invaluable in the rapidly increasing committee work in a large faculty organization.

The Dean, at the end of another year, wishes to express his appreciation to all the members of the teaching staff and finally to the members of the office and secretarial staff on whose efficient and cheerful shoulders falls so much of the routine and executive work of the Faculty.

J. A. MACFARLANE, *Dean*

Medical Society

(September, 1947, to June, 1948)

<i>Honorary President</i>	Dr. J. A. MacFarlane
<i>Honorary Secretary-Treasurer</i>	Dr. R. F. Farquharson
<i>President</i>	P. G. Ashmore
<i>Vice-President</i>	M. L. Bunker
<i>Treasurer</i>	R. G. Erb
<i>Secretary</i>	R. Smith

This report is divided into functions of the Society of a purely social nature, functions of more serious vein, and changes in the constitutional set-up of the Society, with some recommendations.

The first activity of the Society was the initiation of the incoming Pre-Medical Year. The practice, begun last year, was continued and the more boisterous initiation proceedings of former years was replaced by a "Freshman Night" at Hart House. Several members of the medical profession in the city were present, and some of the younger men outlined the activities of the Medical Society. The President of the M. A. A. and the President of the Society spoke briefly, while the main address of the evening was given by the late Dr. Roscoe Graham, whose death this year is a very great loss to the medical students of this University. Though the evening was very successful, it was apparent that in future every effort should be made to have the initiation evening in a location where the female members of the class can also be present. Also, in future, the refreshments should be served afterwards in such a manner that the medical men present have the greatest possible opportunity of meeting and talking informally to the Freshmen students.

The Meds-at-Home this year maintained a high standard. It was thoroughly organized by the Vice-President of the Society, and the use of Medical talent for entertainment, plus good management, resulted in a considerable profit for the Society. A change in regulations by the Royal York Hotel necessitated selling part of the refreshments to the staff members present, and made it more apparent that the cost of the dance could be greatly reduced if the invited staff members were charged for the dance. The suggestion that this be done was made by many staff members present, who assured the Society that they would be very glad to share part of the cost. It is expected that some action in this direction will be taken next year.

The annual "Daffydil Nite" produced by the Daffydil Committee of the Society was a very successful show, playing to a full house in Hart House Theatre for four nights in December. What the production lacked in dramatic interpretation, it made up in enthusiasm, and it was greatly enjoyed by both those who saw it and those who were responsible for its production. Some improvement might be made in the future in the distribution of complimentary tickets to the various faculties and colleges on the campus, who favour the Medical Society with invitations to their social events. The over-all success of this year's Daffydil Nite, however, speaks for itself.

The Medical Arts and Letters Club attempted this year to arouse more enthusiasm in the Medical Society members. Its success was not overwhelming, but several good meetings were held, that addressed by Dr. Markowitz being especially well attended. It is increasingly obvious that it is most difficult to arouse a very universal interest in this Club. However, the Chairman and his assistants are to be congratulated on a successful year.

The Medical Music Association continued to provide an interesting outlet for those medical students interested in choral singing. Several concerts, and an excellent performance at "Daffydil Nite" highlighted the activities of the club.

The University of Toronto Medical Journal, under the able guidance of its Editor, and with enthusiastic co-operation of the staff, underwent something of a "renaissance" this year, and with its regular, punctual publication returned to a position where it can successfully solicit and publish advertising. The subject matter

of the year's articles was of high calibre. Handicapped throughout the year by rising costs of publication, and by a very limited budget, the staff of the *Journal* did a job which deserves enthusiastic congratulation from the Society. It is to be hoped that future Societies will be as fortunate in their *Journal* editorial staff, and that the standards reached this year will be maintained. Towards the end of the year arrangements were made with the Medical Alumni Association to have the *Journal* included as one of the approved journals on their application form, with provision for subscription through their organization. They also agreed to exhibit our *Journal* at their booth at this year's C.M.A. Convention in an attempt to increase our list of subscriptions with Toronto alumni.

In an attempt to acquaint every member of the Society with the actions—past and proposed—of the Executive, a *Medical Society Bulletin* was published this year. This Bulletin contained information pertinent to class activities, and to activities of the subsidiary organizations of the Society. It was well received by the Society members, and it would seem to be worthwhile to continue its publication. For this purpose, and for that of handling public relations through the *Varsity* and *Torontonensis*, a new position was created on the Society Executive—that of Public Relations Director.

Some constitutional changes were made this year, the most important of which was to increase the Medical Society Fee by \$2.00. It has become increasingly apparent that the \$5.00 fee (\$4.00 in the two premedical years) is inadequate, the *Journal* and the Athletic Association suffering particularly, and most severely, from lack of funds. The new assessment should bring our athletic activities into line with those of the other faculties and colleges, and will insure a further improvement, with increase in the size of our *Journal*. In conjunction with this increase, provision has been made for an annual budget meeting in the spring term, at which the outgoing and incoming executives will review the proposed budgets of the subsidiary organizations in an attempt to ensure an optimum of economy in the coming year. Some minor changes were made in the manner of conducting the elections, and a Public Relations Director, and Ex-Service Representative were added to the Society Executive.

Financially the year was a successful one. At the beginning of the year the Society was some \$450 in debt, owing to an unpaid balance on the *Journal* account. A policy of rigid economy was carried out during the year, in an attempt to erase this deficit, and our financial position was made much more secure by the payment to the Society by the Bursar of the University of a considerable amount in unpaid D.V.A. Society fees.

At the end of the year we are left with a substantial operating surplus. In addition we increased our tangible assets this year by the purchase of a mimeographing machine. Combined with the increase in fees our financial position at present is more secure than it has been for a number of years.

The annual election in March resulted in a turnout of over 70 per cent of the Society members, and Hart House Theatre was filled throughout the afternoon by interested voters. A continuation of the type of election which has been held for the last two years would seem to be essential in assuring a good attendance at the election. Any executive elected by such a large percentage of its electorate body as this year's, is assured of the confidence of that body. I would like to take this opportunity to congratulate the new executive, and to wish them every success in the coming year.

P. G. ASHMORE

Medical Athletic Association
(September, 1947, to June, 1948)

Honorary President	Dr. G. H. W. Lucas
President	F. L. Clement
Vice-President	W. A. Cochrane

<i>Secretary-Treasurer</i>	P. B. Heaton
<i>Publicity Manager</i>	H. R. Davies
<i>IV Medical Representative</i>	A. B. Antoni
<i>III Medical Representative</i>	J. K. Armstrong
<i>II Medical Representative</i>	E. D. Hubbard
<i>I Medical Representative</i>	J. B. McIlraith
<i>II Premedical Representative</i>	E. St. E. Thompson
<i>I Premedical Representative</i>	K. I. Mustard

This year has been a highly successful, if not an outstanding, year for medical athletics. The usual problems of inadequate finances and apathetic interest on the part of many students were encountered but these were not of major importance.

During the course of the year Meds entered teams in interfaculty football, soccer, basketball, volleyball, lacrosse, and hockey. There were also entries in track, harrier, golf, tennis, boxing and wrestling, and swimming and water polo. Several students also participated in Intercollegiate sports such as football, soccer, track, swimming and hockey. Approximately thirty-two teams were entered and equipped by the Athletic Association, representing about 36 per cent of all medical students. These teams all showed up well in competition, and several were outstanding. The Senior Meds football team went through an undefeated season only to lose 1 to 0 on a snowy field in the semi-finals of the Mulock Cup playoffs. They have the consolation that they twice defeated the present Mulock cup holders during the season. The Senior Lacrosse team played exceptionally well and emerged as University champions. The Senior Meds hockey team played the role of giant killers and advanced to the Jennings Cup finals. They lost to a heavier and more experienced Senior School team however. Several basketball teams reached the playoffs and one volleyball team advanced as far as the finals of the playoffs.

At the end of the year it was found that Medicine had placed seventh in the T. A. Reid trophy race, behind the Arts colleges and S.P.S. This was so, not because of the quality of our teams, but because the quantity of persons entered in individual events was small.

In February the Annual Spring dance was held at the Club Kingsway and approximately 22 M's and 8 special awards were presented by the Honorary President.

The big problem of the year that beset the Executive was that of finances. The increased number of participants and increased cost of equipment and awards threw a heavy burden upon the budget. During the course of the year approximately \$1,000 worth of new equipment was purchased and although medical students pay less than any other faculty to their Athletic Association, our teams were amply equipped. They cannot remain so however unless future budgets are increased. Total expenses of the Association for the year were \$1,700.

The co-operation and interest of the members of the executive and the remainder of the students of Medicine, which is so vital for successful athletics, has been greatly appreciated during the year.

F. L. CLEMENT

Medical Women's Undergraduate Association (September, 1947, to June, 1948)

<i>Honorary President</i>	Dr. H. McKinnon
<i>President</i>	Miss D. C. H. Ley
<i>Vice-President</i>	Miss B. E. MacKinnon
<i>Treasurer</i>	Miss D. H. Stillwell
<i>Secretary</i>	Miss E. F. Line

Throughout this past year, the Association has endeavoured to bring the women of Medicine more closely together in their campus activities. Because we are, of

necessity, spread across the campus in our academic work and are without a college or residence around which to build our extra-curricular hours, it has become increasingly obvious to the M.W.U.A. that the average woman in Medicine knows little or nothing of the women outside her own year. The Medical Society provides for many of the purely organizational wants of the women, but we have attempted to perform a function which we have felt to be peculiar to our particular type of Association, and to provide a nucleus of ideas for those executives who will follow us. It is our hope that this Association may in future become the medium through which the woman in Medicine builds a firm foundation for her life in her profession, and one through which she may be able to solve many of the problems that may confront her during her academic years.

Initiation of the incoming women was the first duty of this past year. The women of the senior year were each placed in charge of a freshie for her first day, and made responsible for her registration in various classes. The women of this year held a luncheon for the freshies at noon on registration day, in lieu of the formerly held "Bunnie Lunch." The sophomore year were in charge of the lighter aspects of initiation, and the preparations for the formal Initiation Banquet held in October. This is to be an annual dinner, at which all the members of the M.W.U.A. gather to formally welcome the new members of the Association, and to hear the address of the Honorary President, Dr. H. MacKinnon, and the President.

Each year at least two evening parties are held. One at Christmas to collect toys for the University Settlement and one in the spring term in honour of the senior year, under the direction of the III Medical Year and the Vice-President. This year, in addition, the Association inaugurated a series of "Open Forum" meetings, in which the M.W.U.A. members meet with women members of various professions to discuss topics of mutual interest. These meetings were confined to a discussion of the various specialties in Medicine, and the opportunities for training and practice which are offered to women in these fields, including that of general practice. Next year plans have been laid to extend these discussion groups to cover a wider range of topics, and to include among the guests student members of other faculties, and if possible visiting members of other universities.

The Constitution was revised to bring it into line with the new Medical Society Constitution, and several additions were made. Among these were plans for an Honorary Award specifically for the women, to "an outstanding undergraduate of the Faculty of Medicine, and a member of the M.W.U.A.," not necessarily a member of the executive. Plans are also in order for some way of recognizing those women graduates who have given of their time as Honorary Presidents of the Association, and who are now by constitution life members of the Association.

At all times the Executive was ready to help any member of the M.W.U.A. in any way possible, and there were many times during the year when various minor problems were solved for an undergraduate member. Carried over to next year are items concerning the facilities for women at the various hospitals in the city, and the redecoration of the Common Room in the Medical Building.

A detailed financial report was submitted to the Medical Society at the close of the year, and will be found in their financial statement.

DOROTHY C. LEY

Medical Women's Athletic Association
(September, 1947, to June, 1948)

President	Lois Lloyd
Vice-President	Estelle Heakes
Secretary	Joan Fletcher
Treasurer	Ruth Alison

Although no team championships were won in intramural sports, the Medical Women's tennis, baseball, hockey, swimming, basketball and volleyball teams played many excellent games. Well over half of all medical women participated in athletics this year. The individual University of Toronto Women's Golf Championship was won again by Lois Lloyd.

Two medical women tried for the Intercollegiate Women's Swimming team and one of them was runner-up in the Intercollegiate Diving Championship held in Hamilton this year. For those less interested in competitive swimming, a splash party was held at U.T.S. pool for all medical women.

Medical women also took part in a few relay events at the Meds Track Meet.

In recognition of their athletic achievements, nine medical women were awarded M's, and bars were awarded to four members of the premedical years. Also, the University of Toronto Women's Athletic Directorate awarded University colours to four students and citations to three.

The financial budget required the total grant from the Medical Women's Undergraduate Association of \$150. New equipment purchased this year included one dozen hockey sweaters, nine hockey sticks, tennis balls and an athletic equipment box which was kindly made for us by Mr. McCormack of the Anatomy Department and painted by the girls.

The athletic year closed on March 17 by introducing a new occasion which the executive hoped might become traditional. This was a banquet attended by all participators in sports and the coaches of all the teams. By the sale of tickets, the banquet was entirely self-supporting financially. Miss Gretel Haeberlin as guest speaker described "Present Conditions in Europe." The enthusiasm of all present amply fulfilled the hopes of the executive.

LOIS LLOYD

FELLOWSHIPS, SCHOLARSHIPS, MEDALS AND PRIZES

Awarded at Convocation, June, 1948

GRADUATE

The Arch Hutchison Fellowship	D. J. MacKenzie, B.A., M.D.
The Lister Prize in Surgery	} G. A. Lane, M.D. E. D. Gagnon, B.A., M.D., F.R.C.S.(C.)
The Percy Hermant Fellowships in Ophthalmology	
	J. F. Aikenhead, M.D.
	S. Y. Shirley, M.D., C.M.
	M. Shusterman, M.D.
	S. A. Solomon, M.D.

FOURTH MEDICAL YEAR

The Cody Gold Medal	E. R. Yendt
The Cody Silver Medal	R. H. Sheppard
The Cody Silver Medal	W. O. Geisler
The Chappell Prize in Clinical Medicine . . .	E. A. McCulloch
The Chappell Prize in Clinical Surgery . . .	E. H. Simmons
The David Dunlap Memorial Scholarship . . .	W. O. Geisler
The Ellen Mickle Fellowship	E. A. McCulloch
The William John Hendry Memorial Prize in Obstetrics and Gynaecology	J. H. Mowbray
The Ontario Medical Association Prize in Preventive Medicine	E. R. Yendt
The Doctor Roy Simpson Scholarship in Paediatrics	W. O. Geisler

THIRD MEDICAL YEAR

The David Dunlap Memorial Scholarship . . .	A. Rapoport
The Ronald S. Saddington Medal in Pathology	R. M. C. Harrison

SECOND MEDICAL YEAR

The John Copp Bursary	P. B. Heaton
The Posluns Brothers Scholarship	{ D. I. Gove
	{ R. F. Hetherington
	{ R. M. Hines

FIRST MEDICAL YEAR

The Sara Borsook Bursary	E. Klein
The David Dunlap Memorial Scholarship . .	Miss S. M. Ramcharan

REGISTRATION OF STUDENTS IN THE FACULTY OF MEDICINE
SESSION 1948-1949

First premedical year	150
Second premedical year	140
First medical year	191
Second medical year	157
Third medical year	169
Fourth medical year	157
Art as Applied to Medicine	11
Diploma in Psychiatry	10
Diploma in Public Health	22
Diploma in Radiology	3
Bachelor of Science (Med.)	4
Graduate students	
Anatomy	27
Ophthalmology	10
Oto-Laryngology	6
General	10
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	1,067
Advanced refresher courses in medicine, surgery, obstetrics and gynaecology, September-October, 1948	70

Anatomy

Under the direction of Professor J. C. B. Grant

This year, for the first time, the course of instruction given to Medical students by the Department of Anatomy was begun and completed within the space of one academic year. It had been our hope that the study of Neuro-Anatomy might be postponed until the second medical year, but owing to the duplication of classes no manipulation of the time-table would allow of this arrangement. Except for this compression the undergraduate instruction provided by the Department this year was the same as in the year that preceded it. The post-graduate instruction was enlarged to include two additional courses; one in Anatomy for anaesthetists; the other, Anatomy for the Advanced Refresher Course.

Last year, 1,258 undergraduate and graduate students worked in the Department; this year the number was 1,217. They were distributed amongst the various courses as follows:

UNDERGRADUATE COURSES IN GROSS ANATOMY:

1. Medical, first year	163
Art as Applied to Medicine	4
2. Medical, second year	161
Physical Therapy, teachers' course	3
Art as Applied to Medicine	3
3. Dental, first year	159
4. Physical Therapy, first year	26
5. Physical Therapy, second year	34
6. Occupational Therapy, first year	65
7. Occupational Therapy, second year	120
8. Physical and Health Education, second year	102
9. Physical and Health Education, third year	112
10. Optometry	106

GRADUATE COURSES IN GROSS ANATOMY:

11.	M.S. and F.R.C.S. Courses	52
12.	Ophthalmology	9
13.	Oto-Laryngology	12
14.	Anaesthesiology	10
15.	Dental Specialties	7
16.	Demonstrators of Anatomy to medical students	5
17.	Demonstrators of Anatomy to dental students	4
18.	Advanced Refresher Course	39
19.	Graduate Nurses	21

Further, four separate courses in Histology were given: (*a*) for medical students, (*b*) for dental students, (*c*) for students of physical and health education, and (*d*) for students of physiology and biochemistry. Also, a number of occasional and special graduate students worked in the Department.

Dr. Sylvia Bensley, of the Department of Anatomy in the University of Chicago, spent six months with us as visiting Professor, and the members of this Department and of others benefited from her expert knowledge of cytology and cytological technique. During this short time she investigated the effects of hyaluronidase on the skin, directing particular attention to the mast cells.

In the past the Department has had many, indeed very many, excellent demonstrators, but not at one time has it previously had so many capable, responsible, and energetic full-time demonstrators. To them the success of the year's work, as revealed by the results of the examinations, must in no small measure be attributed.

It should never be forgotten that very much is usually owed to the skill, originality, and personality of the technical staff.

RESEARCH

Under the direction of Professor A. W. Ham

Dr. Margaret Armstrong has continued studying the effects of serially transferred mouse mammary tumours from strains of mice that carry the milk factor in the yolk sacs of fertile eggs. She has shown by injecting young test mice with frozen-and-thawed tumour extracts, that the milk factor is still present in tumours that have been transferred from egg to egg over thirty times. Lately, her attention has been directed to an attempt to determine the nature of a factor recovered from the yolk sacs of chicks that were hosts to lethal mouse tumours of many egg transferences which on injection into fertile eggs kills the embryos in the latter half of the incubation period by causing hypoglycaemia and anaemia.

Dr. A. Carrie has investigated the effect of sarcoma 37 on the blood sugar levels of a series of rats made diabetic with alloxan. Large tumours neither lowered the blood sugar levels of diabetic rats on normal diets nor increased the rate at which the blood sugar level fell during ten-hour periods of starvation.

Dr. W. R. Harris devised an apparatus for measuring the shearing strength of epiphyseal plates in the growing animal. Shearing was found to occur along the line of mature, but as yet uncalcified, cartilage cells. Growth hormone given to castrated rats reduced the shearing strength of the epiphyseal plate by increasing the thickness of this weak layer of mature cartilage cells. Large doses of female sex hormone, on the other hand, increased the shearing strength of the plate by reducing the thickness of this layer of cells. These findings may have a bearing on the etiology of slipped epiphysis, particularly in those cases associated with dystrophia adiposo-genitalis, a condition characterized by an obvious lack of sex hormone and in which slipped epiphysis occurs at the time of the normal adolescent growth spurt.

Dr. R. K. McDonald, Fellow in Ophthalmology, has studied the effects produced in the eyes of rabbits and guinea-pigs by injecting testicular extract subcutaneously and intraperitoneally over considerable periods of time. He found that in the rabbit the character of the intercellular substance of the anterior ciliary

processes alters under these conditions, a sulphated type of mucopolysaccharide being substituted for hyaluronic acid.

Dr. McDonald, in collaboration with Dr. W. R. Harris and Dr. Marjorie Mosbaugh, has also found that after the long-continued administration of testicular extract the striated muscles of rabbits and guinea-pigs become riddled with degenerative and proliferative lesions comparable to some seen in rheumatic conditions. More work is needed to establish whether the muscle lesions are due to the hyaluronidase in the extract acting upon a substrate in the muscle or whether they are in the nature of a foreign protein reaction.

Under the direction of Professor J. C. B. Grant

Dr. J. C. Callaghan and H. K. Nancekivell have made investigations into the broncho-pulmonary segments and the tracheo-bronchial tree, using latex of different colours and fusible metals. Dr. G. T. Ho has investigated a hundred vertebral columns of known age and sex with reference to the incidence and distribution of osteophytes. Dr. J. McLister has assembled the apparatus and taken the initial steps in injecting with plastics the vascular channels in the head of the femur.

Under the direction of Professor C. G. Smith

Dr. R. Mahanti is investigating the elasticity of the different segments of the spinal cord, spinal dura mater and roots of the spinal nerves.

PUBLICATIONS

- ARMSTRONG, M. I. and HAM, A. W. "Effects, particularly anemia, on chicks by growth in their yolk sacs of mouse mammary tumors" (*Cancer Research*, vol. 7, 1947, pp. 481-90).
 GRANT, J. C. B. *An atlas of anatomy* (second edition). Baltimore: Williams & Wilkins. 1947.
 GRANT, J. C. B. and CATES, H. A. *Handbook for dissectors* (third edition). Baltimore: Williams & Wilkins. 1948.
 HARRIS, W. R. "Intercellular substances" (*University of Toronto Medical Journal*, vol. 25, 1948, pp. 145-50).

Art as Applied to Medicine

Under the direction of Miss Maria T. Wishart

Some of the more outstanding work of members of the Faculty of Medicine, to which we had the honour to contribute illustrations during the past year, appears in the following list: the unique volume of "Essays on Surgery" presented to Dr. W. E. Gallie upon his retirement as Professor of Surgery; the Hunterian lecture given by Dr. H. W. Wookey on "The Surgical Treatment of Carcinoma of the Hypopharynx and the Oesophagus" published in the *British Journal of Surgery*; Drs. Clement and R. J. P. McCullochs' article, "A Hereditary and Clinical Study of Choroideremia" published in *Transactions of the American Academy of Ophthalmology and Otolaryngology*; Dr. A. E. MacDonald's article on "Lindau's Disease" to be published in Sir John Parson's Birthday Volume; Dr. W. E. Gallie's article "Repair of Recurring Dislocation of Shoulder Joint" published in the first issue of the *British Journal of Bone and Joint Surgery*; Dr. A. W. Ham's *Textbook of Histology*.

Articles were also illustrated for those holding the most junior of appointments. This is an angle we would like to encourage as it is of definite help to the young staff members in that their subject-matter can be more clearly put across with the aid of a good illustration.

Some outside work, always placed second to departmental work, was undertaken. This broadened the field and proved good experience. As such work is charged for, we were able to use these extra funds to pay the students for work they did for the Department, thus increasing the volume of work turned out by the Department as a whole.

The first two students to graduate from the course of Art as Applied to Medicine in 1946 were Miss Elizabeth Blackstock and Miss Marguerite Drummond, both of whom had been assisting in this Department for some years previous to the com-

pletion of their course as part-time student medical artists. In 1946-47 they both served six months alternately in this Department and the Hospital for Sick Children, following which Miss Blackstock was appointed full-time assistant medical artist in this Department and Miss Drummond was appointed medical artist to the Hospital for Sick Children and fellow in this Department.

Interesting visitors to our Department during the year were: Dr. F. Kingsley Norris, Director of Post-Graduate Studies, Royal Australasian College of Surgeons, Melbourne; Dr. Donald Moore, Professor of Pathology, Saskatoon; Mr. L. Farrer-Brown, Secretary of the Nuffield Foundation; and Dr. Peter Hansell, Director of Medical Photography, Westminster Hospital Medical School, London, England.

At the time of writing we are busy organizing a small exhibition, "Contribution of Graphic Art to Medical Education," for the Scientific Exhibit of the Canadian Medical Association to be held in Toronto in June. This exhibition is to be entirely the work of Canadian medical artists. The *Journal of Modern Medicine* is most kindly covering the expenses and their assistance is sincerely appreciated.

In October, 1947, Miss Wishart attended a meeting of the Association of Medical Illustrators in New Orleans.

In November, 1947, Miss Wishart spoke to the Canadian Medical Record Librarian's Association on "Medical Illustration as a Profession."

Since beginning the teaching course in Art as Applied to Medicine three years ago, we have started each year with the allotted number of students—four, but for various reasons the numbers have been reduced so that in the combined three years, the total number equals nine, rather than twelve. This turned out to be a blessing, for at that the small classroom had to be used at staggered hours and the departmental studio also had to be turned over to the students' use at odd times. This seriously slowed up the departmental work. It is, therefore, with pleasure that we look forward to the use of a larger room in the old church at the corner of Elizabeth and Grenville Streets for the coming year, though the change will in turn pose other serious difficulties such as lack of water and air pressure facilities and accessibility to autopsies and the operating room. At best it can only be considered temporary until the whole unit can be housed compactly on one floor.

We have been fortunate in attracting a good type of student and the continued number of inquiries from all parts of Canada and the United States ensures the maintaining of this standard.

Biochemistry

Under the direction of Professor H. Wasteneys

There have been no changes in the academic staff of the department during the year. Professor G. C. Butler, who joined us at the beginning of the session, has taken on the instruction of students in the Faculty of Dentistry and has shared with Professor Wynne in the instruction of advanced students. His connection with the Division of Atomic Energy of the National Research Council has been valuable in facilitating the procurement of tracer elements for research work in the department.

There have been some changes in the technical staff which have considerably increased the efficiency of that department.

The arrangements for teaching were affected by the change in the curriculum through which medical students now take their complete course in their first year, and by the considerable increase in the numbers of dental students. Careful planning made it possible to accommodate all students, but the limit of space has been reached.

Three students obtained the M.A. degree, Dr. J. C. Laidlaw, Dr. D. L. Wilson and Miss Oriana Josseau. Miss Josseau carried out her research in the Banting and Best Department of Medical Research.

I feel that I should make some reference to the difficulty experienced in providing essential teaching and research equipment and chemicals from the departmental appropriation. Generous grants from the National Cancer Institute of Canada, The

Ontario Cancer Treatment and Research Foundation, The National Research Council, The Foster Bequest and the University's Advisory Committee on Scientific Research made it possible to carry out our research programme and to provide some equipment essential to further research.

The various researches carried out by members of the Department are described in a separate report.

The total number of students registered in the Department during the session was 496. This number was made up of 159 Medical students, 18 students of the General Course, 41 in the Physiology and Biochemistry Course, 9 in Biology, 1 in Food Chemistry, 44 in Household Economics, 2 in Household Science, 168 Dental students and 54 graduate students. Of the graduate students 16 were candidates for the Ph.D. degree, 28 for the M.A., 1 for the D.V.Sc., 3 for the B.Sc.Med., and 6 were occasional students or graduate students not proceeding to a degree. Fourteen of these students were candidates for the M.A., 5 for the Ph.D. and 2 for the B.Sc.Med. in Biochemistry.

RESEARCH

Under the direction of Professor A. M. Wynne

Mr. A. W. Jackson has continued his investigations into methods of concentrating and purifying the amylases formed by the fermenting bacteria *Clostridium acetobutylicum* and *Bacillus polymyxa*. He has studied the action of these enzymes on amylose and amylopectin and has made preliminary studies of the nature of groups in the enzyme-protein molecule which are essential for catalytic activity, and of factors affecting the formation of the enzyme in the cells.

Mr. W. L. Holmes has made a critical examination of methods for the estimation of the cytochrome oxidase activity of living tissues and has studied the effect of mouse mammary carcinomata, serially transferred in fertile eggs, on the cytochrome oxidase content of the developing embryos.

Mr. J. D. O'Reilly has investigated the enzymatic degradation of glucosamine by kidney slices and homogenates and by *Escherichia coli*.

Dr. H. B. Stewart has studied the reaction of chloramine-T with each of twenty-two different amino acids. Certain discrepancies noted by previous workers in the case of some of the amino acids were examined, and corrective measures were applied in these cases in order that the reaction with chloramine-T might serve as a basis of a method for the quantitative determination of the amino acids. Studies of the mechanism of the decarboxylation-reaction were made and a satisfactory manometric procedure for following the liberation of free amino acids during the acid hydrolysis of small amounts of protein was developed. During the course of the work it was necessary to prepare pure tryptamine from tryptophane, and a method more satisfactory than any hitherto described was devised for this purpose.

Dr. C. G. Stewart has been engaged in a study of micro-methods for the determination of pyruvate and lactate in blood, and in an investigation of the influence of mouse mammary carcinomata, serially implanted in fertile eggs, on the content of pyruvate and lactate and on the pyruvate-lactate ratio in the blood of the developing embryos.

Miss J. B. Boylen has undertaken a comparative study of the activity of the alkaline phosphatase in the serum of normal rats, of tumour-bearing rats, of rats made diabetic by the administration of alloxan and of tumour-bearing alloxan-diabetic rats.

Mr. D. H. Laughland has achieved very considerable concentration and purification of an enzyme in rat liver which catalyzes the degradation of β -carotene as revealed by the progressive reduction of the extinction coefficient at 325 m μ . Factors affecting the activity and stability of the enzyme have been studied.

Under the direction of Professor G. C. Butler

Dr. J. A. Little is studying the enzymatic degradation of thymus nucleic acid. He has investigated the thymonucleodepolymerase obtained from beef pancreas with regard to its ability to reduce the viscosity of aqueous solutions of sodium thymus nucleate and to liberate acid-soluble organic phosphate from thymus nucleic acid and thymus nucleohistone.

Dr. G. A. Low has completed his critical chemical study of the Feulgen nucleal reaction. Optimum conditions for obtaining the reaction were found and the production of a colour with Schiff's reagent by acid hydrolysed thymus-nucleic acid and a number of simple sugars, and aldehydes was compared. As a result of these quantitative studies it may now be assumed that the test is specific for thymic acid.

Mr. A. M. Moore has estimated, by chemical analysis, the synthesis of purines in developing flax seedlings together with the effect of various growth inhibitors on nucleic acid metabolism. This work was undertaken in order to elucidate the mechanism of these inhibitory effects and to discover new inhibitors in the hope that such a study may provide new information concerning the mechanism of nucleic acid synthesis in plants.

Dr. R. J. Slater has completed his study of the antigenicity of thymus nucleic acid and nucleohistone. On prolonged administration of either of these materials, alone or with adjuvants, to rabbits, it was not possible to demonstrate the presence of circulating antibodies by means of precipitin or complement fixation tests.

Mr. D. B. Smith is engaged in evaluating the effects of various chemical agents on the viscosity of aqueous solutions of sodium thymus nucleate. As a preliminary to this work, a considerable study of viscosimetric methods has been necessary; this study is proceeding with the aim of correlating the results of viscosity measurements with the molecular dimensions of dissolved sodium thymus nucleate.

Mrs. E. R. Solkin has developed a specific method for estimating the amount of borneol glucuronic acid in urine. The method has been applied to studies of the excretion of borneol glucuronic acid in the dog, the rat and man, and has given more exact information than was possible by former methods. Guanidine is known to produce abnormal carbohydrate metabolism in rats. This is confirmed by Mrs. Solkin's observation that after the simultaneous administration of guanidine and borneol to rats almost no conjugated glucuronic acid appeared in the urine while administration of borneol alone showed appreciable amounts of borneol-glucuronic acid.

Under the direction of Professor B. F. Crocker

Mr. J. L. Koppel has continued his study of mechanisms for the synthesis of enzymes. *Micrococcus lysodeikticus* has now been grown through repeated transfers on several different, completely synthetic media. The use of such synthetic media, rather than the ordinary broth media, makes possible close control of all environmental conditions. Methods for the determination of the activity of the enzyme fumarase have been standardized with the object of studying its metabolism. Cultures of the organism, both those grown on a broth medium and those grown on the synthetic media, are being lyophilized to provide a standard source of organisms for the experiments on enzyme synthesis.

Under the direction of Mrs. J. Manery Fisher

Dr. D. L. Wilson investigated the electrolyte content and permeability of rabbit leucocytes. He has established the following facts: (a) that rabbit leucocytes, like red cells, are relatively permeable to chloride, (b) that, unlike rabbit red cells, they contain almost equivalent concentrations of sodium and potassium, (c) that internal sodium and potassium concentrations are influenced by external glucose concentrations, (d) that intracellular sodium and potassium can be almost completely replaced by ammonia and (e) that radioactive sodium penetrates leucocytes rapidly.

Mr. J. S. Barlow has extended the research on the electrolyte pattern and permeability of growing cells. Breast muscle of three-day chicks contains much higher chloride, sodium and water concentrations, and much lower potassium than the muscles of an adult bird. The extracellular space of young muscles is large and there is some evidence that most if not all of the chloride is extracellularly situated. Young chick muscles differ markedly from mammalian muscles.

Dr. J. M. Fisher has shown that during the formation of the hardened external membrane of trout eggs, chloride crosses the membrane to enter the perivitelline space, thus demonstrating that early in its formation this membrane is permeable to salts. A method of removing membrane from the egg for analysis of its calcium content has been perfected.

PUBLICATIONS

- BARLOW, J. S., SLINGER, J. S. and MANERY, J. F. "Effect of age on the concentration of chloride and water in chick tissues" (*Journal of Gerontology*, vol. 2, April, 1947, pp. 110-15).
- ROSE, D. "The amylase of *Bacillus polymyxa*" (*Archives of Biochemistry*, vol. 16, March, 1948, pp. 349-55).
- YOUNG, L. "Observations on the effects of mustard gas on the rat" (*Canadian Journal of Research*, vol. E25, June, 1947, pp. 141-51).

Hygiene and Preventive Medicine

Under the direction of Professor D. T. Fraser

The enrolment of physicians in the course for the diploma in Public Health for the session 1947-48 was twenty-one. In other courses, one student registered for the diploma in Industrial Hygiene; four students for the diploma in Dental Public Health and nine students for the diploma in Veterinary Public Health. Nine students, two of whom were from India and one from China, proceeding to the Master of Applied Science degree, were given a special course in Microbiology. More than half of the students in the above courses have served in the armed forces. One physician was granted a fellowship by the Connaught Medical Research Laboratories. Including the students of this year, the total number of physicians enrolled for the diploma in Public Health since 1911 is 427.

As in previous years, courses of instruction in Bacteriology, Immunology and Parasitology were given to the students in the course leading to the diploma in Public Health, diploma in Dental Public Health, diploma in Industrial Hygiene and diploma in Veterinary Public Health as well as to suitably qualified graduate students.

The first, second and third years in the Faculty of Medicine received instruction in the form of combined tutorial and lecture courses in preventive and social medicine, including hygiene and sanitation. The new course to the fourth medical year was given for the second time. This course is equivalent in some respects to the former and long-established field course but differs in that certain of the exercises were amplified and new topics emphasized. In particular, it provides better opportunities for the student to observe the practical application of social medicine.

The discussions on the social security measures introduced in Canada together with the newer forms of medical care and the effect of these plans on the practice of medicine evoked a lively interest among the members of the classes. The visit with the public health nurse to the homes of patients to observe the social and economic aspects of health continues to be one of the most interesting aspects of the course. This is the only opportunity of the student to visit the home in the entire undergraduate training.

Through the co-operation of the Director of the East York-Leaside Health Unit a fellowship was inaugurated whereby a member of the third medical year is attached for duty to a health unit for July and August. It is hoped to extend this

practice so that a number of students may avail themselves of the opportunity of working with health units throughout the province. As evidence of the interest in this apprenticeship plan, fourteen members of the present third medical year applied for the single vacancy.

Laboratory courses and lectures were given as usual to the students in the second year in Pharmacy, second- and third-year Household Science and Household Economics, third-year Physiology and Biochemistry, third-year Physical and Health Education, second-year Food Chemistry, and to students in the School of Nursing.

A comparison of the numbers of students receiving instruction in the Department shows that the numbers have more than doubled since 1945 when 483 students were enrolled and have increased by another 100 since last year; the total number for 1947-48 is 1,182. The enrolment for the session has been as follows:

Candidates for the diploma in Public Health	21
Candidates for the diploma in Dental Public Health	4
Candidates for the diploma in Veterinary Public Health	9
Candidates for the diploma in Industrial Hygiene	1
Students registered in the School of Graduate Studies	15

Faculty of Medicine	
Fourth year	130
Third year	159
Second year	162
First year	162
Faculty of Arts	
Household Economics, second and third years	100
Physiology and Biochemistry, third year	20
Food Chemistry, second year	19
Faculty of Household Science, second and third years	6
School of Physical and Health Education, third year	112
School of Nursing	116
Ontario College of Pharmacy, second year	146

RESEARCH

Dr. M. Brown is carrying on research in the preparation and stabilization of B.C.G. vaccine as well as in methods of vaccination with this product. He is also investigating the effect of certain physical agents on the antigenicity of typhoid and cholera vaccine.

Dr. F. O. Wishart is continuing his studies of recall doses of diphtheria and tetanus toxoids in relation to long-term antitoxic immunity in school-children and medical students. The nasal route for recall doses of tetanus toxoid is also being investigated.

Dr. Frieda Fraser, as a member of a team, has devoted much of her available time to the study of antibiotics. Through the effective co-operation of the Department of Botany, a large group of new strains of micro-organisms have been tested for their activity against selected cultures. In particular, a search has been made for strains active against the tubercle bacillus and encouraging results have been obtained. A number of new preparations of penicillin designed to prolong its action have been tested. The clinical study in co-operation with Dr. L. Lome at the Women's College Hospital of penicillin in oil and beeswax in the treatment of gonorrhoea has been continued.

Dr. R. J. Wilson is continuing his studies of the nutritional requirements of H. pertussis and toxicity tests of the vaccine. This latter part of his work is in co-operation with the National Institute of Health, Washington.

Dr. H. Plummer has been studying the conditions for the production of the antibiotic subtilin and its effectiveness in experimentally infected animals.

Miss M. Langley submitted the results of her research on streptococcus bacteriophage. In the course of this work a new antibiotic, probably of academic interest only, produced by a strain of beta haemolytic streptococcus, was discovered.

Mr. G. Shaw has worked on the growth of the tubercle bacillus in Dubos' medium.

In the sub-department of Parasitology, under Dr. A. M. Fallis, Dr. Kuitunen has carried out a large number of routine laboratory examinations on material submitted by hospitals and physicians for the laboratory diagnosis of protozoan and helminth infections. A number of samples, which had been collected from Eskimos in the eastern Arctic by Dr. M. Brown, were examined for eggs or other stages of parasites.

The efficacy of a new drug for pinworm infection, which was kindly supplied by the British drug houses, is being studied by Dr. Kuitunen in co-operation with Dr. I. Booth, Children's Aid Society, and Dr. D. James, Infants' Home. The results to date suggest that the drug is no more effective than that in use at present.

Dr. Kuitunen began a study of the susceptibility of hamsters to a number of human protozoan and helminth infections and found that *Endamoeba coli*, *Giardia lamblia*, *Trichinella spiralis* and the pinworms of rats and mice would live in hamsters. A survey of wild carnivores was continued to determine whether they are infected with *Trichinella spiralis*.

Miss Z. Christie has continued her studies on gametocytes in malaria infections using *Plasmodium gallinaceum* as the experimental organism.

PUBLICATIONS

- FRASER, D. T. "The present status of immunization against diphtheria" (*Bulletin of the New York Academy of Medicine*, vol. 24, 1948, pp. 332-3).
- FRASER, F. H. and LOME, L. "Penicillin in oil and wax in the treatment of gonorrhoea in women" (*Canadian Journal of Public Health*, vol. 38, 1947, pp. 484-90).
- PARKER, R. C., PLUMMER, H. C., SIEBENMANN, C. O. and CHAPMAN, M. G. "Effect of histolytic infection and toxin on transplantable mouse tumors" (*Proceedings of the Society for Experimental Biology and Medicine*, vol. 66, 1947, pp. 461-7).
- WISHART, F. O. and JACKSON, L. K. "Tetanus toxoid—the recall dose" (*Canadian Journal of Public Health*, vol. 39, 1948, pp. 181-6).

Medicine

Under the direction of Professor R. F. Farquharson

It is a pleasure to acknowledge the indebtedness of the Department of Medicine to Professor Duncan Graham. With great care he built up a large medical staff of outstanding, well-trained physicians, a rich heritage to leave to his successor. His influence persists and grows at home and abroad in the men he has trained. It is hoped that the Department will be able to live up to the high standards of honour, clinical excellence, sound teaching and research for which he always strove and which he achieved to a remarkable degree.

Teaching has been carried on much as in previous years. In spite of the larger number of clinical teachers, the increasing size of the undergraduate classes makes it difficult to keep the individual clinic groups small enough for adequate teaching. Graduate students have also been present in increasing numbers, taking special work for periods of a few weeks or a few months, serving as voluntary fellows and also in casual attendance.

Approximately twenty physicians took the seven weeks' special graduate course in September and October for candidates studying for Fellowship examinations of the Royal College of Physicians and Surgeons of Canada as well as for any physicians interested in advanced training. Dr. Allan Walters has paid particular attention to methods of graduate teaching of psychological medicine.

Personnel:

The Department regrets to announce the retirement of Dr. E. S. Jeffrey who served for many years as a teacher in clinical microscopy and later on the staff of the Department in the Diabetic Clinic at the Toronto General Hospital.

Dr. E. F. Brooks has succeeded Dr. Harris McPhedran as Assistant Professor of Medicine and as Physician-in-Chief at St. Michael's Hospital.

Dr. Trevor Owen has succeeded Dr. W. F. McPhedran as Assistant Professor of Medicine in charge of the Medical Out-Patient Department at the Toronto General Hospital.

Dr. R. Ian Macdonald was appointed Director of Medicine at Sunnybrook and Christie Street Department of Veterans Affairs Hospitals.

Dr. Arthur H. Squires has been appointed to the staff of the Department to take charge of the teaching of clinical microscopy to the second medical year.

Dr. Irwin M. Hilliard has been appointed to the staff of the Toronto Western Hospital after a year's service in the Department at the Toronto General Hospital.

The following clinical teachers have also been appointed to the staff of the Department: Drs. Carl R. Burton, Cameron C. Gray, H. Charles Hair, Donald B. Moran and Jonathan C. Sinclair.

RESEARCH

With the active interest and assistance of Drs. J. Hepburn and H. E. Rykert, Drs. Burton and Moran have studied electrocardiographic changes in cardiac disease and especially in patients with cardiac infarcts in various locations, using multiple chest leads; Dr. Murnaghan has studied the blood volume at various stages of pregnancy; Drs. Greenwood and Murnaghan have continued the study of congenital heart disease, using cardiac catheterization in addition to other techniques, and have begun a long-term study of the patho-physiological changes of orthopnoea and cardiac failure. Dr. Kerwin has also studied congenital heart disease, using cardiac catheterization.

Drs. Pugsley and Oille have undertaken a study of the late results of primary tuberculous pleurisy with effusion. Dr. I. Hilliard has undertaken a study of blood oxygen saturation, vital capacity and other physiological changes in emphysema and pulmonary atelectasis, and in patients after operations on the chest. In this work he has had the co-operation of Professor Ferguson and Dr. D. M. Finlayson of the Department of Pharmacology.

Drs. A. A. Fletcher and J. W. Graham have continued the study of problems of arthritis both at the Toronto General Hospital and Sunnybrook Hospital. Under their direction, Dr. D. C. Graham has undertaken a careful follow-up study of the results of treatment of ankylosing spondylitis in veterans, and of nutritional changes in various stages of rheumatoid arthritis.

Dr. W. R. Campbell has continued the study of serum protein fractions in various diseases. He has also continued his work on methods of spectroscopic identification of various abnormal haemoglobin derivatives.

Drs. Maltby, Dickson and Brown have made a careful follow-up study of haemorrhage in peptic ulcer. They have shown that the higher mortality in older patients is associated with the presence of serious degenerative diseases. Working with Dr. I. Macdonald at Sunnybrook and Christie Street Hospitals, and with Dr. Marion Ross, Bacteriologist at Christie Street Hospital, Dr. R. C. Dickson has made an extensive study of amoebiasis among veterans in Toronto.

Dr. R. B. Kerr and Dr. A. L. Chute of the Department of Paediatrics have undertaken a long-term follow-up study of diabetic children.

Dr. J. C. Sinclair and Professor J. Dauphinee of the Department of Pathological Chemistry have continued the study of chronic liver diseases, liver function tests and various aspects of jaundice.

Dr. K. J. R. Wightman has completed an investigation begun last year with Dr. A. M. Johnson on the allergic reactions suffered by some patients receiving liver extract. He has continued the study of metabolism of fat, carbohydrate and protein in steatorrhoea. Working under Dr. Wightman's direction, Dr. R. M. Taylor has investigated absorption of carbohydrate from the duodenum in patients with steatorrhoea. Dr. Taylor has also made a careful study of blood pyruvate levels during the period of glucose absorption in normal persons and in patients deficient in thiamine chloride; he has demonstrated that an abnormal blood pyruvate curve may be a useful indication of severe thiamine deficiency.

Dr. H. H. Hyland has continued the study of anorexia nervosa. Under his direction, Dr. G. O. Watts has made a careful study of the progress of patients with pernicious anaemia and subacute combined degeneration of the spinal cord, who have been under treatment for fifteen years or more. Their work demonstrates the complete arrest of the lesion by adequate treatment and the lack of any gross deterioration with advance of years. Dr. Hyland and Dr. J. C. Richardson have continued the study of the late results of subarachnoid haemorrhage in patients first observed several years ago. Dr. Richardson and Dr. A. S. Douglas have studied the late active stages of poliomyelitis in an attempt to determine the ultimate duration of late improvement and the degree of permanent damage. Dr. Richardson has studied electroencephalographic changes in various diseases. With Dr. Mary Tom of the Department of Neuropathology, he has also studied the pathological changes in the central nervous system in a case of long-continued hypoglycaemia; they have demonstrated degenerative changes in the anterior horn cells as well as in the brain.

Working in association with Professor P. H. Greey of the Department of Bacteriology, Drs. H. C. Hair and J. L. Uren have studied the use of streptomycin in gonococcal urethritis. They have shown that the gonococci are quickly affected by streptomycin and that cure may follow a single dose of one-third to one-half gram in over 50 per cent of cases. Drs. Hair and R. C. Smith, in association with Professor Greey, have made an extensive study of blood penicillin levels following injection of various special preparations such as penicillin in oil and beeswax. Drs. E. J. Trow, H. A. Dixon and H. C. Hair have continued an active investigation of penicillin therapy of syphilis.

Dr. N. M. Wrong, working with Dr. C. D. Gossage of the University Health Service, has studied the beneficial effects of a special sulphonated sulphur lotion in treatment of acne in university students.

PUBLICATIONS

- BATES, G. "Venereal disease—a social and moral problem" (*Health*, vol. 16, 1948, p. 12).
- BROWN, W. H. "Medical research in the Canadian Army" (*Journal of the Royal Canadian Army Medical Corps*, vol. 88, 1947, pp. 141-52).
- CAMPBELL, W. R. "Tremor—normal and pathological" (*Transactions of the Association of American Physicians*, vol. 60, 1947, pp. 151-9).
- CAMPBELL, W. R. and DAUPHINEE, J. A. "Serum proteins in hepatic disease" (*Medical Clinics of North America*, March, 1948, pp. 455-68).
- CLARKE, A. P. W., CLEGHORN, R. A., FERGUSON, J. K. W. and FOWLER, J. L. A. "Factors concerned in the circulatory failure of adrenal insufficiency" (*Journal of Clinical Investigation*, vol. 26, 1947, pp. 359-63).
- DICKSON, R. C. "Acute infections of the liver" (*Medical Clinics of North America*, March, 1948, pp. 469-85).
- DOYLE, A. M. and CALVERT, L. J. "Picrotoxin therapy in severe barbiturate poisoning (case presentation)" (*Ontario Medical Review*, vol. 15, 1948, pp. 2-4).
- FARQUHARSON, R. F. "Training of a physician" (*University of Toronto Medical Journal*, vol. 25, 1948, pp. 169-71).
- GRAHAM, W., HENCH, P. S., BAUER, W., BOLAND, E. W., CRAIN, D. C., FREYBERG, R. H., HOLBROOK, W. P., LOCKIE, L. M., MCEWAN, C., ROSENBERG, E. F. and STECHER, R. M. "Rheumatism and arthritis: Review of American and English literature of recent years. Ninth rheumatism review" (*Annals of International Medicine*, vol. 28, 1948, pp. 66-168, 309-451).
- HAMILTON, F. C. "Congenital heart disease" (*University of Toronto Medical Journal*, vol. 25, 1947, pp. 38-43).

- HYLAND, H. H. "Physiotherapy in the psychoneuroses" (*Canadian Physiotherapy Journal*, vol. 2, 1948, pp. 6-8).
- MALTBY, E. J. and OWEN, T. "Diseases of the biliary tract" (*Medical Clinics of North America*, March, 1948, pp. 486-99).
- SINCLAIR, J. C. and DAUPHINEE, J. A. "Chronic hepatitis: The cirrhoses" (*Medical Clinics of North America*, March, 1948, pp. 500-17).
- SINCLAIR, J. C. and FARQUHARSON, R. F. "Jaundice" (*Medical Clinics of North America*, March, 1948, pp. 443-54).
- SMITH, R. C. "Laboratory diagnosis of superficial fungous infections" (*University of Toronto Medical Journal*, vol. 25, 1948, pp. 157-62).
- WIGHTMAN, K. J. R. "Diseases of the pancreas" (*Medical Clinics of North America*, March, 1948, pp. 518-36).

Obstetrics and Gynaecology

Under the direction of Dr. H. B. Van Wyck

The close of the year 1946-47 brought the retirement of Professor N. D. Frawley as Obstetrician and Gynaecologist-in-Chief at St. Michael's Hospital and as Assistant Professor of Obstetrics and Gynaecology in the University. Doctor Frawley had given long and distinguished service to both his hospital and the University and has left an enviable record as teacher and clinician. The large number of students who graduated during his term of office will always remember gratefully his kindly personality and the wisdom of his guidance. Doctor Frawley has been succeeded by Dr. F. J. O'Leary who has been appointed Obstetrician and Gynaecologist-in-Chief of St. Michael's Hospital and Assistant Professor of Obstetrics and Gynaecology in the University.

Doctor W. A. Dafoe resigned from the clinical staff of the Toronto General Hospital to become head of the Department of Obstetrics and Gynaecology at the Wellesley Hospital, the University retaining his services as Associate.

The following promotions have been announced during the past year: Dr. W. T. Noonan, Dr. John Mann and Dr. G. L. Watt to Associates; Dr. W. H. Murby to Senior Demonstrator.

During the past year the degree of F.R.C.O.G. has been conferred on four members of the Department: Dr. D. M. Low, Dr. W. A. Dafoe, Dr. John R. McArthur and Dr. R. B. Meiklejohn.

The Department is pleased to announce the appointment of Dr. Geraldine Maloney as Fellow on the clinical staff of the Toronto General Hospital, and Dr. E. S. Macdonald as Junior Demonstrator on the staff of St. Michael's Hospital. Dr. Crawford Shier was appointed a Fellow during 1947-48 as Resident in Obstetrics and Gynaecology at the Toronto General Hospital. He has received an appointment under Dr. TeLinde at the Johns Hopkins Hospital for further study in 1949. Mrs. Mary Gillean was appointed Secretary to the Department.

During the past year the staff, comprising the groups from each of the three teaching hospitals, has been working in increasingly closer co-operation. Four combined staff meetings were held during the year. One at the Toronto General Hospital was a symposium on the work and results to date of the Rh Factor Committee which represents all the Toronto hospitals. The combined meeting at St. Michael's Hospital was addressed by Dr. W. T. Noonan on the subject of "Hydatidiform Mole," and by Dr. Apted on the "Surgical Cure of Stress Incontinence." At the meeting at the Western Hospital a paper was read by Dr. A. D. T. Purdy on a review of the hysterectomies done by the Western Hospital staff, and Dr. T. C. Jewell gave a short review of the results of chest X-ray of all pre-natal cases for the year. At the General Hospital in April the combined staff met with the Department of Medicine in a symposium on "The Indications for the Termination of Pregnancy." All these meetings were well attended and proved of great interest and value. Each hospital group carried on their own local staff meetings, often with guest speakers from other departments.

The staff is grateful to Dr. Charles Best, Professor E. Fidler, Dr. W. G. Bigelow and Dr. J. C. McClelland who contributed to the programmes. The Clinical Pathological Conferences held by Dr. William Boyd on gynaecological subjects were attended by all three hospital groups and much appreciated.

The Department has been honoured by many distinguished visitors during the past year. Professor van Bouwdijk Bastiaanse, chief of the Frauen Clinic at the University of Amsterdam, spent several days with us. He addressed the Physiology Club on some research in the etiology of eclampsia and demonstrated by a moving picture his method of vaginal hysterectomy for early cancer of the cervix.

Mr. Charles Read of the Chelsea Hospital, London, spent a week as guest of the Department. He performed several operations, among which were two demonstrations of the Millin Sling cure for stress incontinence, and lectured to the fourth-year class on "Correction of Congenital Absence of the Vagina." He left an enduring memory of his kindly and forceful personality.

Sir William Fletcher-Shaw spent a few days with us, and the Department was privileged to have him address it at a luncheon given in his honour.

Grand Rounds have been held in the three hospitals each week throughout the year and an effort has been made to make visitors from out of town welcome. The schedule of these rounds is available upon request at the Dean's office and it is hoped that returning graduates on their visit to Toronto may avail themselves of the open invitation to attend.

The radical change inaugurated at the beginning of the fall term of 1946, by which the time-tables of the department of Obstetrics and Gynaecology and the department of Paediatrics were combined in the fourth year for a complete term of nine weeks, has worked well. Four days each week were devoted to Gynaecology and Obstetrics and two to Paediatrics. It is believed that the two courses running concurrently have benefited by this closer association.

On each Monday afternoon clinical conferences have been held for the fourth year class. These have been distributed among the three hospitals. At these conferences current cases of interest have been discussed and the students provided with a mimeographed copy of the case history and the staff comment. On Thursday afternoon at each of the hospitals, students of the fourth year have read these on specific subjects before the group of their fellow students. These seminars have been presided over by members of the staff. It is gratifying to be able to record that the theses have been of a very high standard, and it is believed that an opportunity for formal presentation of a scientific paper such as these seminars provide is very valuable training for the students. It is also noteworthy that the majority of the students were able to illustrate their theses by lantern slides, the stock of which has been markedly increased during the past year. An effort was made to make these seminars as formal as the usual well-conducted session of a scientific session. It is hoped that visiting graduates will find it beneficial to attend these clinical conferences and seminars and take part in the discussion. Such visits of the graduates to these undergraduate sessions are very stimulating and gratifying to both staff and students.

During the past academic year, one or more hours of teaching were carried out each week by the presentation of moving-pictures. Some of these were purchased by the Department, others were rented from the National Film Society of Canada who were very co-operative in providing films at a nominal charge, and many useful films were loaned by Ingram and Bell, Limited, Mead Johnson & Company of Canada, Abbott Laboratories Limited, and John Wyeth & Brother. By these means it was possible to show a new programme each week. A perusal of the titles will indicate the nature and value of this addition to our teaching methods: Manoeuvres on the Ayres Manikin, Normal Delivery, Vaginal Hysterectomy, Total Abdominal Hysterectomy, Treatment of Face Presentation, Treatment of Breech Presentation, Manchester Operation, Delivery of Quadruplets, Laparotrachelotomy, Complete Laceration of the Perineum, Foetal Birth Injuries, Craniotomy, Low Caesarean Section, The Forceps Operation and Episiotomy, Appraisal of the Newborn, Radiopelvimetry,

Treatment of Eclampsia, Manual Rotation in the Management of Occiput Posterior and Occiput Transverse Positions, Some Aspects of Endocrinology, The Human Cervix in Health and Disease, and Continuous Spinal Analgesia in Caesarean Section. It is hoped, by both purchase and loan, to add to this list of subjects for moving-picture presentation, as it is believed that the tendency to make an increasing use of visual aids in teaching should be followed.

Our arrangements of the fourth-year time-table were carried out. During the fourth year, students were rotated through the three teaching hospitals. This has enabled fourth-year students to see a larger variety of clinical material and have the benefit of teaching in all three hospitals. The change became necessary because of the larger numbers in the fourth year. By sending groups to all three hospitals the unit for bed-side teaching has been markedly reduced. This made it necessary to modify the third year time-table and postpone the living-in period in hospital until the fourth year. This enabled each fourth year student to live in hospital for three weeks during his last year. New teaching equipment has been purchased during the past year including laboratory apparatus, slides, slide cabinets, wall charts, etc.

With the increasing size of the classes, the burden of teaching has increased. The academic course of thirty-six weeks will be reduced during the next year to thirty-two weeks and it is believed that this shortening of the course will serve the interests of the students.

In addition to the usual staff, the Department is grateful for the conscientious help received from the Voluntary Assistants: Dr. Magnus Spence, Dr. John Oswald, Dr. William Flatt, Dr. Herbert Tait, Dr. R. G. MacKenzie, Dr. J. C. McKellar, Dr. A. L. MacKenzie, Dr. B. E. Meek, Dr. Gordon Chambers and Dr. J. T. McCormack.

In conjunction with the other departments, an advanced refresher course is being planned in Obstetrics and Gynaecology, in September 1948, for candidates who wish concentrated instruction preparatory to going up for examination either for Fellowship in the Royal College of Physicians and Surgeons or for certification as specialists in Obstetrics and Gynaecology.

One of the most important functions of the Department is the providing of facilities for students who wish to qualify in Obstetrics and Gynaecology. The course that at present is available in this Department comprises two years' training as senior interne, one year as Resident, and one year as Fellow in Obstetrics and Gynaecology, or one of the basic sciences. This year, an exchange has been arranged with the department of Surgery by which our senior interne in training receives a period of training in general surgery. Posts available are naturally limited but application may be made to the Dean or the head of the Department.

RESEARCH

Reported by Professor H. B. Van Wyck

The Rh committee which was established under the chairmanship of Dr. P. Greey, with Dr. Low representing the Department, for the investigation of the Rh factor problem in the Toronto area in November, 1946, has carried on actively since that time. By April, 1948, approximately eleven thousand patients had been tested in the Toronto area. At first the survey included only public ward cases in the Toronto General, Western and St. Michael's Hospitals. By April, 1947, this had been enlarged to include six more hospitals, namely Toronto East General, St. Joseph's, Women's College, Wellesley, Mount Sinai and the Hospital for Sick Children. Beginning May 18, 1947, arrangements were concluded for a complete prenatal blood examination for all private obstetrical patients in the hospitals taking part in this survey. Besides a routine estimation of Rh factor and antibodies, this examination includes haemoglobin estimation, blood grouping and serological tests for syphilis. It has been found that approximately 1 per cent of obstetrical patients have

been isoimmunized. It is felt that this service will be of value and may occasionally save lives.

A report of the results of the survey with the experience gained in the treatment of isoimmunized mothers and the results in the treatment of erythroblastosis fetalis is being prepared by this Department with the co-operation of the Department of Pathology and the Hospital for Sick Children. This city-wide plan, as it embraces the whole community, marks an important step forward in preventive medicine.

Under the direction of Dr. Mann, the research on the mechanism producing convulsions in eclamptic toxæmia is progressing. Assembly of the physical equipment in a room for this purpose at the Burnside Obstetrical Department is almost completed. In conjunction with the Department of Medicine, electroencephalogram investigation is being done on potential eclamptic patients with a view to increasing our knowledge of the pre-eclamptic state. Dr. Mann has also undertaken to organize a systematic management of the non-surgical treatment of pelvic inflammation. It is hoped that in conjunction with the Department of Physiotherapy a depot for thermal therapy can be established on the gynaecological wards of the General Hospital and that the efficiency and control of this form of therapy may thereby be increased.

The major research project carried out in the pathological laboratory of the Department under the direction of Dr. N. Henderson during the past year has been the study of vaginal smears. Dr. Maloney has been carrying on an investigation to assess the reaction as observed in vaginal smears to standard high-voltage radiation therapy of carcinoma of the cervix. All cases examined have been drawn from the gynaecological clinic of the Dunlap Institute at the Toronto General Hospital. New patients presenting themselves at the clinic have a smear taken from the pool of the posterior fornix of the vagina on their first examination. The patients then receive routine treatment and, during the time they are under treatment, a similar smear is made at weekly intervals. Smears have been subsequently collected from those patients who have completed treatment when they present themselves for their follow-up examinations. So far, only a limited number of patients have reached this stage of investigation. The diagnosis in all cases is always substantiated by biopsy before treatment is begun. In this investigation, the vaginal smear is therefore not being employed as a method of diagnosis. So far, approximately seventy cases of cervical carcinoma have come under investigation in this manner. It has been found that in a fairly large percentage of advanced lesions of the cervix, where there is widespread disease and considerable necrosis, carcinoma cells do not appear in the vaginal smear. These cases are therefore useless in the series. So far three cases have been found in which typical malignant cells persisted in the smears taken throughout treatment. These cases are still being observed. It is premature at this stage in the study to reach any conclusions. A large number of cases will require study over a considerable length of time. The object of the study is specifically to try and pick out, while still under radiation therapy, the 20 per cent or more of stage one and two carcinoma of the cervix which do not respond to this type of treatment and are not salvaged by it, with a view to altering their treatment before the lesion becomes advanced.

Dr. Henderson has also studied the wider application of the smear in diagnosis of early carcinoma in the genital tract. One year's investigation does not warrant too definite opinions but a consideration of all factors involved has led to the present opinion that the widespread use of vaginal smears for diagnosis of uterine carcinoma is neither practical nor of established value. Further study and investigation is required before the role of vaginal smear diagnosis of malignancy can be determined.

A clinical and pathological review of nearly three hundred cases of ectopic pregnancy has been completed during the year. The results of this review will be reported next year. Progress has been made in the reclassification of malignant

ovarian tumours which was begun last year. This has proven to be more formidable and time consuming than was expected, and the work is still not completed.

The treatment and investigation of uterine, vulvar and ovarian cancer has been continued by Dr. W. G. Cosbie and Dr. J. McArthur who represent the Department in the radiological service under the direction of Dr. Richards. The efficiency and extent of the service rendered are due to the excellent organization that has been built up by Dr. Richards in co-operation with those who represent the clinical department. The cancer clinics continue to show a great increase in the number of patients under treatment and observation.

In co-operation with the Department of Public Health Nutrition under the direction of Professor E. W. McHenry, some phases of protein metabolism in the toxæmias of pregnancy are being investigated and clinical tests have been carried on in the obstetrical wards. A nutritional survey was also completed in the prenatal clinic. Dr. W. J. McGanity, a Fellow in the Department of Public Health Nutrition, has been employed in these projects.

Further progress in the investigation of sympathetic nerve trunk anaesthesia in the first stage of labour has been made under the clinical supervision of Dr. Low with the assistance of Dr. R. Gordon of the Department of Therapeutics and Dr. R. G. MacKenzie of the Department of Anatomy.

Dr. J. R. McArthur has begun, with the co-operation of the Department of Medicine, an investigation of the anaemia problem in pregnancy.

The endocrine outdoor clinic is being supervised by Dr. M. C. Watson, and plans are projected for the investigation of problems in this field and the search for clinical and laboratory standards for the evaluation of endocrine disturbances of the female reproductive function.

With the co-operation of Dr. Fletcher of the Department of Paediatrics, studies have been carried on at the Burnside for the past two years in problems related to anoxia, atelectasis and prematurity.

A committee for the study of thrombosis and embolism was formed in April to correlate laboratory research and clinical work, with Dr. Johnston representing the Department.

The problem of the application of radio pelviography in its relation to clinical work has been under consideration for the past year. Various techniques have been studied and considered and it has been decided to test the routine use of the modified Thoms method under the clinical direction of Dr. Watt, who is preparing a comparative survey of results.

PUBLICATIONS

- COSBIE, W. G. "The effect of better obstetrics on maternal mortality" (*Bulletin of the Academy of Medicine*, Toronto, vol. 20, no. 10, July, 1947, pp. 209-14).
- FLATT, W. D. "Causes of difficult resuscitation of the newborn" (*Bulletin of the Academy of Medicine*, Toronto, vol. 21, no. 1, Oct., 1947, pp. 8-15).
- HENDERSON, D. N. "Common disorders of menstruation" (*Bulletin of the Vancouver Medical Association*, vol. 24, no. 7, April, 1948).
- "Ovarian tumours" (*Bulletin of the Vancouver Medical Association*, vol. 24, no. 6, March, 1948, pp. 210-16).
- JOHNSTON, H. W. "An improved technique for salpingostomy" (*American Journal of Obstetrics and Gynecology*, vol. 55, March, 1948, pp. 426-9).
- VAN WYCK, H. B. "Modern education"; in *Year book and proceedings of the Ontario Educational Association*, 1947, p. 30. Toronto.
- "The practice of obstetrics and gynaecology" (*University of Toronto Medical Journal*, vol. 25, Jan., 1948, pp. 133-6).

Ophthalmology

Under the direction of Professor A. J. Elliot

The Department of Ophthalmology extended the postgraduate training during the session 1947-48 to include a week's refresher course given in conjunction with the department of Oto-Laryngology. There were twenty registrants, and the guest

speaker in Ophthalmology was Dr. P. A. Chandler of Harvard Medical School. Dr. Chandler gave three lectures on glaucoma and an operative surgical clinic. Members of the staffs of the four teaching hospitals combined in providing lectures and surgical clinics on recent developments in Ophthalmology.

The three-year postgraduate training programme in Ophthalmology continued to develop with the following additional courses added to those noted in last year's report: Orthoptics, Psychosomatic Ophthalmology, Writing of Medical Articles, Medical Finance and Office Management. A satisfactory system of rotating the internes through the four teaching hospitals was developed in order to utilize as much as possible the clinical material available at each hospital. This rotation has been successful due to the valuable co-operation of the eye staffs in the various hospitals. The five senior internes each presented a scientific paper before the section of Ophthalmology, Academy of Medicine during the past session. Several of these papers will be published. The Department also offered its facilities to several externes who attended clinics, lectures, etc., for periods of one to six months.

Undergraduate teaching in Ophthalmology was expanded to include St. Michael's Hospital and the Toronto Western Hospital during the past session. These teaching clinics have materially assisted in developing the Department.

The department of Ophthalmic Pathology continued to enlarge its work and Dr. T. H. Hodgson provided individual instruction in ocular pathology to each of the senior internes in the postgraduate course. The Department was grateful to referring physicians for forwarding specimens, enucleated eyes, etc. A special ophthalmic pathology form was distributed in order to provide clinical data with these specimens.

Plans were further advanced during the past year regarding the proposed Eye Institute and the erection of a building with adequate public ward eye beds, semi-private and private accommodation, eye library, lecture theatre, operating rooms, optical shop, research laboratories, etc. The Department will be grateful to receive funds and bequests towards the endowment of research in the proposed Eye Centre.

Dr. A. L. Morgan was elected President of the Alumni Association of the Institute of Ophthalmology, New York City. Dr. J. F. A. Johnston was elected Secretary of the Canadian Ophthalmological Society, and Dr. J. C. McCulloch was appointed Canadian Secretary for the American Association for Research in Ophthalmology and Canadian Editor of the *Quarterly Review of Ophthalmology*.

At the Canadian Ophthalmological Society the Head of the Department gave a paper on "Recurrent Intra-Ocular Haemorrhages in Young Adults," and Dr. A. L. Morgan spoke on "Orthoptics." Dr. W. R. F. Luke lectured before the Wayne County Medical Association, Detroit, on "The Eye in Industrial Medicine." Dr. J. C. Hill gave a paper at the Canadian Medical Association annual meeting on "Ocular Manifestations of Head Injuries."

RESEARCH

Basic research was carried out by Dr. W. P. Callahan, Dr. R. K. MacDonald, Dr. J. L. Burns and Dr. H. S. Hamilton. During the academic year, Dr. W. P. Callahan has done work on two problems. In one he has tested for dark adaptation to red light. This problem has been completed, and he found that red light did not affect adaptation. He has also been working on tri-stimulus colorimetry. He has developed a tri-stimulus anomaloscope using filters to produce the three primary colours. He is using the instrument for a study of yellow colour. This work has been done under the direction of Professor D. Y. Solandt of the Department of Physiological Hygiene. Dr. R. K. MacDonald has been working on hyaluronic acid and hyaluronidase. He has studied the histological changes in the eyes of rats which have received many injections of hyaluronidase. He has found that the decreased intra-ocular tension which follows the injections of hyaluronidase is accompanied by a hyperglycaemia in rabbits. This work has been under the direction of Professor

A. W. Ham of the Department of Anatomy. Dr. J. L. Burns has been studying intra-ocular haemorrhage in the eyes of rats which are on a choline-deficient diet. He has found that the haemorrhages arise from the hyaloid artery. They occur when the rat has uraemia. The uraemia is produced as a result of kidney deficiency that in turn is a result of choline deficiency. This work has been under the direction of Dr. W. S. Hartroft and Professor C. H. Best of the Department of Medical Research. Dr. H. S. Hamilton has been working on local anaesthetic agents. He has charted the toxicity of a number of agents; he has also plotted the duration of anaesthesia against the concentration of anaesthetic agents when applied intradermally and locally on the cornea. He has also worked out a quantitative chemical method for the estimation of a number of common local anaesthetics. This work has been under the direction of Professor J. K. W. Ferguson of the Department of Pharmacology.

PUBLICATIONS

- CRAWFORD, J. S. "Two newer types of implants used after enucleation" (*Canadian Medical Association Journal*, vol. 58, no. 5, May, 1948, pp. 444-7).
- ELLIOT, A. J. "The differential diagnosis and treatment of an acutely red eye" (*Bulletin of the Vancouver Medical Association*, vol. 23, no. 12, 1947, p. 344).
- "Ocular findings in important neurological conditions" (*Bulletin of the Vancouver Medical Association*, vol. 23, no. 12, 1947, p. 340).
- "Ophthalmic indications of systemic disease" (*Bulletin of the Vancouver Medical Association*, vol. 23, no. 12, 1947, p. 336).
- "Treatment of ocular injuries in general practice" (*Bulletin of the Vancouver Medical Association*, vol. 23, no. 12, 1947, p. 333).
- MCCULLOCH, J. C. and MCCULLOCH, R. J. P. "A hereditary and clinical study of choroideremia" (*Transactions of the American Academy of Ophthalmology and Otolaryngology*, Jan.-Feb., 1948, pp. 160-90).

Oto-Laryngology

Under the direction of Professor P. E. Ireland

During the past year the Department has been able to add some capable young men to the teaching staff. This was not possible during the war years. It has increased greatly the teaching efficiency in both the undergraduate and graduate groups. Dr. J. B. Whaley of the Hospital for Sick Children, who was previously attached from the R.C.A.F. to the Air Ministry in London, was added; and Dr. G. A. Henry of the Canadian Army Overseas and Dr. K. G. McAskile of the R.C.A.F. are now with the Department and on the staff of St Michael's Hospital.

The postgraduate course in Oto-Laryngology has been approved by the Faculty Council and now makes available, for the first time in Canada, an approved university course in our specialty. This assures the complete training of postgraduate students to the specialist status within our own Medical School. The full use of all the teaching hospitals on a rotation service is utilized for the clinical training, and the co-operation of the various other departments makes possible the presentation of the necessary basic science subjects. There are twelve men registered in this course at the present time.

Postgraduate teaching for those of the specialty already in practice has only been available in European or American centres. In the month of January, 1948, we presented our first Combined Refresher Course in Oto-Laryngology and Ophthalmology. The teaching was conducted by our university staff with the exception of two guest speakers. The applications came from across Canada to fill the quota of graduates who could be taught. This year the course is to be repeated with an additional one to be added.

We are grateful to Mr. W. H. Wright for his annual donation which makes possible the continuance of the Acoustic Research project which is being conducted

by our Department in conjunction with the department of Physics. This project was originally initiated by the R.C.A.F. during the war years under Dr. J. A. Sullivan, who continues as our representative.

The Department has now an additional sum of money donated through the generosity of the O'Keefe Foundation for teaching fellowships in Oto-Laryngology. This is to be awarded annually as the E. P. Taylor Fellowship, and should add greatly to our postgraduate plans for teaching and research. Two appointments have been made for the coming year for this award.

It is interesting to note the number of distinguished visitors who have visited the Department during the past year. These visitors have been attracted largely by our programme for the medical and surgical treatment of deafness, and have included the outstanding men in this field, as well as the heads of departments in the various schools they represent. Their home universities include Sydney, Cape Town, Stockholm, Paris, Brussels, Groningen and West China. The visitors from the United States were from Boston, St. Louis and Chicago, and our English confreres from Bristol, Oxford, St. Bartholomew's, St. Thomas's and King's. This interest in our work from abroad is gratifying as is also the fact that we have one foreign student in the Department and a number are now applying for short term appointments.

RESEARCH

The research project which was initiated by the R.C.A.F. under Dr. J. A. Sullivan and Professor Burton on the physics of sound and the principles as related to sound perception and hearing defects has been continued. This work has attracted many distinguished visitors from abroad and still continues to serve a useful purpose in assembling information of both basic and clinical importance.

In the Hospital for Sick Children, the clinic for the hard of hearing has continued to function. Investigation of the problem of the effectiveness of radiation treatment to the nasopharynx in deaf children has been continued by Dr. D. E. S. Wishart. The methods of restoring the patency of a stenosed nasopharynx are also being studied by Dr. J. B. Whaley in the same hospital.

A very complete sound-proof room has been installed in St. Michael's Hospital for investigation of handicapped patients with "hard of hearing" symptoms.

At Christie Street and Sunnybrook Hospitals a programme is being carried out by Dr. C. A. Rae and Dr. H. W. McCart to evaluate the use of penicillin and streptomycin in the treatment of ear and sinus infections.

PUBLICATIONS

BARNES, L. S. "The relationship of hyperthyroidism to chronic sinusitis and chronic catarrhal middle ear deafness" (*Bulletin of the Academy of Medicine*, Toronto, vol. 20, no. 9, 1947, p. 161).

IRELAND, P. E. "Diagnosis and treatment of Ménière's symptom complex" (*Canadian Medical Association Journal*, vol. 58, no. 3, 1948, pp. 269-73).

———"Intracranial complications of ear and sinus disease" (*Bulletin of the Academy of Medicine*, Toronto, vol. 21, no. 5, 1948, p. 92).

SULLIVAN, J. A. "Shift of bone conduction threshold on occlusion of the external ear canal" (*Laryngoscope*, vol. 57, no. 11, 1947, pp. 269-73).

WISHART, D. E. S. "Bronchography in bronchiectasis in children" (*Annals of Otology, Rhinology and Laryngology*, vol. 56, 1947, pp. 404-5).

———"Prognosis in the hard-of-hearing child" (*Laryngoscope*, vol. 57, 1947, pp. 444-59).

———"Rhinology in children." Review (*Laryngoscope*, vol. 57, 1947, p. 505).

Paediatrics

Under the direction of Professor Alan Brown

The reorganization of the teaching, whereby the Departments of Obstetrics and Paediatrics are linked up very intimately, has been most satisfactory. It has been of

great benefit to the students as they are able to concentrate on these two subjects which are so closely related.

During the past year we have had 17 postgraduate students—3 from England; 3 from China; 1 from India; 9 from various parts of Canada and 1 from the United States—all of whom seemed pleased with the work they received.

RESEARCH

Many children in their haste to get to school take an inadequate breakfast, or none at all. A low blood sugar level may interfere with both physical and mental activity. A study was carried out on five hundred junior school-children to ascertain whether there was any relationship between the size of the breakfast eaten and the mid-morning level of blood sugar. No correlation was found.

The amount of vitamin C consumed daily during one month by 120 children and adults in families having incomes from \$1,500 to \$2,500 a year was determined. Actual assays were made of the foods as prepared and eaten in the individual homes. In 20 per cent of both adults and children the intake of vitamin C was extremely low. Only 33 per cent of the children and 5 per cent of the adults were consuming the recommended amounts of this vitamin.

Observations were continued upon the enzyme activities in the gastro-intestinal tract of infants and children suffering from infections and digestive disturbances.

Nitrogen balance studies are in progress in the acute diseases of infancy and childhood. It appears that positive nitrogen balances can be brought about in all types of infection by the intravenous and subcutaneous administration of amino acid preparations.

Determinations of intestinal absorption of xylose in cases of coeliac disease and cystic fibrosis of the pancreas have shown it to be normal. In these conditions the absorption of ordinary dietary carbohydrates is depressed.

Studies are in progress regarding the retention and toxicity of fluorine in various forms.

In animals, retention of calcium when fed by mouth in the form of ground cooked bone was found to be equal to that of calcium in milk. An observation is now under way to determine the availability of these two forms of calcium in the adult human.

A preliminary investigation has been made of the urinary excretion of coproporphyrin in poliomyelitis. This work will be extended in the coming year.

A flame photometer for the determination of sodium and potassium has been set up and is now being used in investigating the changes which occur in body fluid content of these substances, especially in diarrhoeal conditions.

Semi micro-methods for the determination of blood non-protein nitrogen and of serum calcium and phosphatase have been developed.

An investigation of all cases of atopic eczema admitted to the Hospital during the past three years was completed. Intradermal skin tests were done on all cases and their significance evaluated. Food sensitivities play an important role in the causation of these cases and the offending foods are avoided by the use of elimination diets. A new type of ointment has been devised which results in more rapid healing of the cases.

The problem of decreasing the absorption of allergenic extracts in the treatment of hay fever cases in children has been extended. By the use of protamine zinc and polyvinyl alcohol the number of doses required for immunization of a ragweed case may be reduced from an average of twenty injections to an average of eight. This is also of much practical importance in the desensitization of asthmatic and allergic rhinitic cases.

A new method, applicable even in the first year of life, has been developed for the study of congenital malformations of the heart. With this method serial X-rays of the heart following intravenous injection of a radio-opaque substance can be

taken at a rate up to four per second for a total of twenty-eight films. This new diagnostic procedure has been found of great value in the early establishment of a final prognosis, in selection of cases which are amenable to surgical treatment and in mapping out the surgical procedures necessary.

The intracardiac catheter has been found useful in the diagnosis of various congenital heart anomalies, particularly in children past infancy.

In co-operation with the Toronto Department of Health, a registry of children suffering from heart disease has been started. Cases are now not only being followed in the Out-Patient Department of the Hospital for Sick Children, but daily visits are being paid to the schools to observe these cases.

Studies on diabetes in childhood disclosed that many of the signs of old age, or degenerative changes, frequently develop at an early age. The degenerative changes most frequently encountered are high blood pressure, arteriosclerosis, haemorrhages in the retina of the eye and nephritis. Patients with these changes are being intensively studied. An attempt has been made to produce these same degenerative changes in animals. Rats were made diabetic by the administration of alloxan and then not given adequate insulin treatment. Albumin has been produced in the urine and cataracts have been developed almost at will. In a number of animals this procedure has resulted in high blood pressure. It is essential that more delicate methods be developed for detection of degenerative changes in man and that the animal studies be extended to give information as to just what products of the deranged metabolism have caused these changes.

In conjunction with the Department of Surgery, studies are being conducted to enable intracardiac operations to be undertaken.

In conjunction with the Departments of Pathology and Surgery, the treatment of erythroblastosis fetalis is being investigated. The use of replacement transfusion appears to be a great improvement over other methods.

In collaboration with the Department of Obstetrics, an efficient method of treatment of asphyxia of newborn infants has been set up and is now in use in the Burnside Obstetrical Department, Toronto General Hospital. This we believe has greatly lowered the mortality and morbidity in the newborn.

A micro-method for the determination of the oxygen content of capillary blood has been adapted for use in infancy and studies on anoxia are now under way.

The production of coeliac disease in rats has been found to depend upon a number of variables. Various parts of the vitamin B complex have been used in the prevention and cure of this condition.

A study has been made of the technique of pre-selection of student nurses. The subsequent history of each of the nurses who has been submitted to the tests is being followed to determine the validity and utility of the tests.

The study of the cortical and ventricular patterns in electroencephalograms in infancy has been continued. An attempt is being made to perform encephalograms *post mortem* to determine what, if any, changes occur as the child's age advances.

A clinical, epidemiological and laboratory study has been made of paralytic, non-paralytic and abortive cases of poliomyelitis. Modes of spread of the disease have been studied in rural districts, mainly in children's holiday camps and in private homes. Laboratory studies were made with the advice of the Connaught Medical Research Laboratories and the aid of the laboratories of the Hospital for Sick Children to eliminate the possibility of other virus diseases. In the field studies, suggestive channels of the spread of this infection were uncovered which must ultimately be confirmed by laboratory investigation. Poliomyelitis virus was not obtained from the stools of a number of clinical cases of non-paralytic poliomyelitis. This, combined with the clinical mildness of the course, would indicate that these patients were suffering from some other form of virus infection of the nervous system or from an extremely mild form of poliomyelitis.

PUBLICATIONS

- CHUTE, A. L. "Survey of patients with juvenile diabetes mellitus" (*American Journal of Diseases of Children*, vol. 75, Jan., 1948, pp. 1-10).
- DONOHUE, W. L. and FREMES, I. A. "Maternal isoimmunization without evidence of clinical erythroblastosis fetalis in the newborn" (*Journal of Laboratory and Clinical Medicine*, vol. 33, May, 1948, pp. 526-31).
- DRAKE, T. G. H. "Antiques of medical interest: Tooth brush set, silver, London, 1799" (*Journal of the History of Medicine*, Winter, 1947).
- JOHNSTONE, W. M. and GALLOWAY, M. E. "The ascorbic content of citrus fruits and juices" (*Journal of the Canadian Dietetic Association*, vol. 9, March, 1948, pp. 134-7).
- KEITH, J. D. "Diagnosis of congenital heart disease" (*Canadian Medical Association Journal*, vol. 58, March, 1948, pp. 247-51).
- "Diagnosis of rheumatic fever and rheumatic heart disease. I and II" (*Canadian Journal of Public Health*, vol. 38, 1947, pp. 390-8, 428-36).
- ROBERTSON, E. C., TATHAM, C. M., WALKER, N. F. and WEAVER, M. R. "The effect of added thiamine on growth, vision and learning, using identical twins" (*Journal of Nutrition*, vol. 34, Dec., 1947, pp. 691-700).
- ROSS, J. R. and BROWN, A. "Management of eczema cases in infancy and childhood" (*Canadian Medical Association Journal*, vol. 58, May, 1948, pp. 486-90).
- SILVERTHORNE, L. N. "Meningitis in childhood" (*Canadian Medical Association Journal*, vol. 58, March, 1948, pp. 255-8).

Pathological Chemistry

Under the direction of Professor J. A. Dauphinee

Changes in the staff. Professor Andrew Hunter who has been the Head of the Department since 1935 retired from the University Staff in June, 1947 to become Professor Emeritus. His retirement is greatly regretted by all and particularly by the permanent members of the Department who have long continued to look to him for wise and friendly counsel and guidance. He was succeeded by the present occupant who was fortunate enough to have been, some twenty years ago, one of Professor Hunter's pupils. He wishes here to record his sincere appreciation of the great help given him by Professor Hunter in undertaking his new position and also to acknowledge with many thanks the whole-hearted support given him by all the other members of this Department.

No other changes have occurred among the Senior members but among the Fellows the new-comers have included Dr. Harold Kalant, a holder of a National Research Fellowship, Dr. R. C. Harrison, who holds a teaching Fellowship and Mr. J. C. D. Barlow, also serving as a teaching Fellow. In addition to these we have been fortunate in the appointment of Miss Maxima David, M.Sc. as Technician in the new clinical research laboratory and of Miss Joyce Little as Secretary to succeed Miss Alice Shannon who resigned in June, 1947.

Teaching. The revised laboratory courses in Pathological Chemistry for the second and third year medical students put into operation during the previous year, largely through the efforts of Professors Nicholson and Gornall, were carried on again this year under the energetic supervision of these two teachers. In the opinion of the writer of this report, who has been but recently a clinician, the laboratory course now given to students of Medicine in this Department should give to them an excellent insight into the pathological chemistry and physiology of a wide variety of metabolic and other diseases, in addition to teaching them a large number of widely practiced and reliable diagnostic procedures. As an example, abnormalities of carbohydrate metabolism are studied during four laboratory periods. For this purpose each class is divided into several sections of six groups each and each of the six groups studies the biochemical disturbances and the diagnostic laboratory features of a given type of this class of metabolic disorders. Urine and blood specimens are specially prepared so as to simulate those found in specific cases and where possible specimens from actual clinical cases are obtained from the wards of the Toronto General Hospital. Interest is enhanced by supplying each group with a summary of the probable clinical history and the important physical findings.

Finally when the laboratory exercises are completed a seminar is conducted with each section by a Junior and a Senior member of the staff in which all six different cases are reviewed in the light of their biochemical and other abnormalities. In this way all variations in disturbances of carbohydrate metabolism from mild non-diabetic glycosuria to far advanced diabetic coma are covered and discussed.

The new edition of the "Laboratory Directions in Pathological Chemistry" has been revised by Professors Nicholson and Gornall and a number of new and proven laboratory techniques have been added to these Directions.

The medical students registered in the Department number 312, of whom 162 are in the second medical year and 150 are in their third medical year. Four graduate students are registered—two are Ph.D. candidates, one is an M.A. candidate and one is taking Pathological Chemistry as a minor for her Ph.D. One graduate student is registered for the B.Sc. (Med.).

In addition to the undergraduate and graduate teaching in this Department lectures have also been given at the graduate refresher course given by the faculty of Medicine in the autumn of 1947 and a short series of lectures was also given to a group of graduate physicians who are taking a special course in anaesthesiology.

RESEARCH

Dr. Dauphinee and Dr. J. C. Sinclair of the Department of Medicine have continued their clinical and laboratory investigations on patients admitted to the wards of the Toronto General Hospital with a wide variety of liver disorders, and Dr. Dauphinee and Dr. W. R. Campbell, also of the Department of Medicine, have applied the Campbell-Hanna technique to a study of the serum proteins in these and other patients.

Dr. H. Kalant has been applying some of the newer methods of amino acid estimations, including microbiological methods (with the collaboration of Dr. P. Greey, Professor of Bacteriology) to the analysis of the abnormal serum protein fractions so commonly met with in chronic liver disease.

Dr. Dauphinee and Mr. C. E. Downs have been studying and comparing various techniques for the determination of sodium, potassium, chloride, calcium and other electrolytes in blood and other body fluids and excreta in preparation for studies on electrolyte disturbances in human illness.

Dr. T. F. Nicholson has completed one phase of his investigation into the effect of high blood urea on the acid base and electrolyte balance in animals and has shown that, when the blood urea was raised, some organic base not usually present appeared in the serum. His studies on the effect of cyanide on the functioning of the kidney *in situ* have shown that oxidative mechanisms are essential for some of the renal secretory functions. He has also continued his investigations on the effect of tartrate nephrosis on kidney function, particularly in regard to the excretion of titratable acid and the formation of ammonia. Preliminary experiments on a histochemical method for the localization of glutaminase tend to confirm his opinion that the site of ammonia formation is probably below the proximal tubule.

Dr. A. G. Gornall and Dr. C. J. Bardawill have continued their study of biochemical and functional changes in experimental liver injury and are attempting to assess the relative merits of (1) high carbohydrate, low protein and (2) moderate carbohydrate, high protein diets in their animals. Particular interest has centred about the changes in serum protein fractions. A detailed study of the biuret reaction has led to modifications in this method. Considerable experience has been gained in a comparison of methods of serum protein fractionation.

Dr. Gornall and Mr. J. C. D. Barlow have been investigating the biochemical changes resulting from intestinal perfusion as a therapeutic measure in uraemia. One object has been to develop a perfusion fluid which would tend to restore normal electrolyte and acid-base balance and which could be varied to correct disturbances of water balance. Dr. E. A. Sellers and Dr. W. H. Allemang have collaborated in this problem.

Dr. Gornall has been given charge of the newly established clinical investigation laboratory, with Miss M. David as technician. In collaboration with Dr. D. C. Graham of the Department of Medicine, a study is being made of the nitrogen balance in cases of rheumatoid arthritis. Dr. D. Tanner has asked for collaboration in a study of saliva in relation to oral cancer; research is to begin as soon as arrangements can be completed.

An invitation is extended to all clinicians who would welcome an association with this Department in the investigation of some pertinent problem, to take advantage of the facilities of this laboratory.

Dr. R. C. Harrison, who is spending a year in this Department as part of his training in surgery, has been working under the general direction of Dr. Bigelow of the Department of Surgery and under the guidance of the staff in this Department, on two main problems. One of them is the problem of "sludged blood." A constant finding in any disease in which there is an inflammatory reaction is intravascular agglutination of the erythrocytes. These agglutinated masses, travelling through the vascular beds, greatly reduce the rate of flow through the smaller vessels, completely plugging many of them, and this presumably interferes with the nutrition of the tissues. The slow intermittent flow as seen in a microscope field resembles sludge or silt and hence the designation "sludged blood." Dr. Harrison, having studied this phenomenon by microscopic visualization of the vascular bed in the conjunctiva in many humans and in animals both sick and well, so that the normal and pathological blood flow could be differentiated, has made numerous attempts to "dissolve" the agglutinated cells with various drugs. Heparin, both crude and highly refined, has been extensively tried with negative results. Quinine and more recently fibrinolysin have also been used. The former was of no value, the results with the latter are still doubtful. The second problem undertaken by Dr. Harrison under the direction of Dr. Bigelow has been a study of metabolism at reduced body temperatures, a study which has been made possible through the kindness of the R.C.A.F., who have permitted the use of the cold room and the many other facilities at the Eglinton Experimental Station for this work. Anaesthetized animals have been cooled until their body temperature has reached as low as 15° C. The respiratory rate, cardiac rate, electro cardiograms, oxygen consumption, arterial-venous oxygen differences, circulation time and other observations have been made during the cooling process. At this temperature there is a remarkable slowing of all body processes. Voluntary respiration ceases, the heart beat becomes extremely slow and oxygen consumption drops to less than 10 per cent of its normal value. Methods of survival have been studied and artificial respiration and oxygen administration have definitely been established as valuable therapeutic measures at these low temperatures. It is hoped that these physiological studies may have some application in vascular surgery.

PUBLICATIONS

- DAUPHINEE, J. A. and CAMPBELL, W. R. "Serum proteins in hepatic disease" (*Medical Clinics of North America*, March, 1948, pp. 455-68).
- DAUPHINEE, J. A. and SINCLAIR, J. C. "Chronic hepatitis: The cirrhoses" (*Medical Clinics of North America*, March, 1948, pp. 500-17).
- GORNALL, A. G., ROGERS, J. W. and SELLERS, E. A. "Intestinal perfusion in the treatment of uremia" (*Science*, vol. 106, 1947, p. 108).
- HUNTER, A. and DOWNS, C. E. "Inactivation of arginase by protein denaturants" (*Journal of Biological Chemistry*, vol. 173, 1948, p. 31).

Pathology and Bacteriology

Under the direction of Professor William Boyd

Reference has been made previously to the effect which a reduction of eighty hours in the time devoted to microscopic work has had on the teaching of pathology. This has been made possible by the application of modern projection methods, as

a result of which a large group can be instructed in microscopic appearances at one time. It is pleasing to find that the students have not only not suffered in this respect, but that they actually have a better grasp of the subject.

Two new additions have been made to the museum. The one is a display of coloured illustrations depicting the pathogenic bacteria and their appearance in culture; the other illustrates the clinical condition and the lesions in all the vitamin deficiencies. Full summaries have been made of the salient facts in our knowledge of the morphology and cultural characters of bacteria and of deficiency conditions by Dr. G. W. Smith and by Dr. A. B. Sinclair respectively. These new sections should be of value both to the undergraduate and postgraduate student.

For many years it has seemed a pity that all the interesting material for which there was no room in the museum had to be thrown away. This was sheer waste. A show case similar to those used by jewellers has now been made in which the specimens of the week can be seen by undergraduates and graduates. A new supply of surgical and autopsy specimens will be provided at the beginning of each week. It is hoped that this display will become a regular feature in the study of graduate pathology particularly.

Numerous additions have been made to the museum collection of microscopic slides during the past year. This collection has now become of great value for post-graduate study.

Dr. H. J. Barrie, formerly pathologist to the Sheffield Royal Infirmary, has joined the staff as Lecturer, an appointment which has considerably strengthened the Department both from the standpoint of teaching and investigation.

In addition to the usual teaching Fellows the following have worked in the Department in a voluntary capacity: Dr. E. C. Evans; Dr. R. H. Penney (mornings only); Dr. A. B. Sinclair (six months). The following visitors have used the facilities of the Department over short periods: Dr. Herman Sikl, Professor of Pathology, Charles IV. University, Czechoslovakia; Dr. F. T. Mao, National North Western University of China, Sian, Shensi, China; Dr. H. N. Green, Pathologist, and Dr. G. W. Blomfield, Radiologist, Sheffield Royal Infirmary; Dr. P. N. Wahi, Professor of Pathology, Agra, India.

The division of Neuropathology was pleased to have Dr. W. Stewart Alexander on their staff for the past ten months. He was on a Fellowship from the University of Otago, New Zealand. After visiting some of the American universities and going on to England, he will return to the Department of Pathology at the University of Otago.

RESEARCH

Dr. W. L. Robinson and Dr. D. N. Henderson have been working at some of the problems of exfoliative cytology, particularly in relation to carcinoma of the uterus and the lung.

The following investigations are in progress: Dr. T. A. B. Boyd, blood cysts on the heart valves of infants; Dr. T. C. Brown, syphilitic aneurysms of the carotid artery; Dr. W. T. W. Clarke and Dr. H. J. Barrie, disseminated lupus erythematosus; Dr. J. A. McLaren, North American blastomycosis; Dr. H. A. MacMillan, pulmonary apical scars; Dr. G. W. Smith, renal lesions in diabetes mellitus; Dr. H. O. Tonning, Lindau's disease, and pneumoconiosis due to Fuller's earth.

In the division of Bacteriology interest in antibiotics and the Rh blood factor continues. The survey commenced last year in co-operation with the hospitals in Toronto now totals more than eleven thousand tests, and ninety obstetrical patients with Rh antibodies in their blood serum have been encountered. Neither the quantity nor the kind of Rh antibody found seems to have much value in predicting the condition of the fetus on delivery. The sensitivity of gonococci to streptomycin has been studied in some detail. Streptomycin differs from penicillin in that it is quite rapidly lethal for the gonococcus. Dr. H. C. Hair of the Department of Medi-

cine is studying the clinical aspects of the subject in the special treatment clinic of the Toronto General Hospital.

Through the generosity of Merck and Company, Dr. Greey obtained supplies of streptomycin and p-aminosalicylic acid adequate for a thorough clinical investigation on the value of these compounds in tuberculosis. At the Toronto Hospital, Weston, with the co-operation of Dr. C. A. Wicks, it was arranged to treat an alternate series of cases with streptomycin alone and combined with p-aminosalicylic acid. Dr. J. C. McClelland, Department of Surgery, is supervising the study of patients with renal tuberculosis included in the series. The laboratory aspects of the subject are being investigated in the Department.

Dr. R. M. Price has continued a study of the bacteriology of selected cases of extrapulmonary tuberculosis and tuberculous meningitis in children. Her interest in BCG as a prophylactic measure against tuberculosis has been maintained and extended. This year over a hundred requests for vaccination were received from tuberculin negative individuals. The group consisted of medical graduates and undergraduates and students from other faculties and from Occupational Therapy. In all instances a satisfactory result was obtained in respect to both the method of vaccination and the development of allergy.

Dr. G. H. Hawks has been receiving, through the kindness of Dr. C. E. van Rooyen and Dr. A. J. Rhodes, advanced instruction in virus infections at the Dufferin Division of the Connaught Medical Research Laboratories.

Dr. R. C. Ritchie has investigated some problems relative to the microbiological assay of essential amino acids. In collaboration with Dr. Kalant of the Department of Pathological Chemistry, it is hoped this summer to obtain some amino acid analyses for serum protein fractions from patients with liver disease.

Dr. R. C. Smith of the Department of Medicine has completed an investigation in the Department on the incidence of *Monilia albicans* in the sputum of patients with pulmonary infections as compared with a control group.

In the division of Neuropathology, Dr. W. S. Alexander has completed a report on the "Pathology of meningitis as it has been influenced by chemotherapeutic agents," using material from this division and from the Pathology Department of the Hospital for Sick Children, in collaboration with Dr. W. L. Donohue.

PUBLICATIONS

- BARRIE, H. J. "Wernicke's encephalopathy in surgical practice: Report of three cases" (*Lancet*, vol. 2, Aug. 23, 1947, pp. 278-9).
- BARRIE, H. J. and HARDING, H. E. "Argyrosiderosis of the lungs in silver finishers" (*British Journal of Industrial Medicine*, vol. 4, no. 4, Oct., 1947, pp. 225-8).
- BOYD, W. *The problem of trauma and malignant disease in compensation work*. Washington: United States Department of Labour, Bureau of Labour Standards. Bulletin no. 94. 1947.
- *Textbook of pathology* (fifth edition). Philadelphia: Lea & Febiger. 1947.
- DONOHUE, W. L. Clinical Pathological Conference: Dysendocrinism. (*Journal of Paediatrics*, vol. 32, no. 6, 1948, pp. 739-48).
- DONOHUE, W. L. and FREMES, I. A. "Maternal isoimmunization without evidence of clinical erythroblastosis fetalis in the newborn" (*Journal of Laboratory and Clinical Medicine*, vol. 33, May, 1948, pp. 526-31).
- GAGNON, E. D. "An unusual case of multiple malignancy" (*British Journal of Surgery*, vol. 35, no. 140, April, 1948, pp. 435-6).
- KURTZ, J. E. "Fuel oil aspiration pneumonia" (*Archives of Pathology*, vol. 45, Feb., 1948, pp. 259-66).
- MACMILLAN, R. L. and PEARSE, R. "Congenital arteriovenous aneurysm of the renal artery" (*Journal of Urology*, vol. 58, no. 4, Oct., 1947, pp. 235-8).
- MAGNER, W. "Enigmatic anaemias" (*Ontario Medical Review*, vol. 14, Aug., 1947, pp. 75-80).
- PRICE, R. M. "Calmette's vaccine BCG" (*University of Toronto Medical Journal*, vol. 25, Dec., 1947, pp. 72-5).
- WALKER, G. R. and BOYD, W. "Case of 'double aorta': Extensive healed dissecting aneurysm of the aorta" (*Canadian Medical Association Journal*, vol. 58, 1948, pp. 379-82).
- WODEHOUSE, G. E. "Haemangioma of the lung: A review of four cases, including two not previously reported, one of which was complicated by brain abscess due to *H. influenzae*" (*Journal of Thoracic Surgery*, vol. 17, no. 3, June, 1948, pp. 408-15).

Pharmacy and Pharmacology

Under the direction of Professor J. K. W. Ferguson

The major courses given by this Department were to the third medical year and to the second dental year. The large classes have taxed our resources to the limit but it is expected that present arrangements will see us over the peak of enrolment. The course in General Pharmacology was given for the third year to a group of 7 or 8 graduate students. This course is developing satisfactorily into an important and permanent feature of our activities. In addition to the foregoing, short courses were given this year to postgraduate students in Dentistry, Oto-Laryngology, and Anaesthesia. Such refresher courses to those studying for certification in the various professional specialties are a post-war development which has not yet reached its peak. Such courses present some problems which have not yet been solved to the satisfaction of all concerned. As in previous years, twelve hours of instruction were given to the second year class of the Ontario College of Pharmacy. When the programme for the new degree of B.Sc.Pharm. comes into operation, a larger and more comprehensive course will be given to students of Pharmacy.

Graduate degrees awarded this year were: Two Ph.D.'s and one M.S.A. In addition, three students qualified for the B.Sc.Med. This degree continues to occupy an anomalous position. It is usually taken by graduates and the work is of a graduate nature comparable to an M.A. but the year's work is not recognized as a year of graduate work by the School of Graduate Studies. Perhaps we need an M.Sc.Med. degree.

The staff has enjoyed this year the help in teaching and research of five medical graduates who have spent the year in the Department as a part of their training in various medical specialties. These capable and relatively experienced young doctors have added greatly to the effectiveness of our teaching and have made it possible to carry the large classes, more or less in our stride.

Dr. E. A. Sellers, Assistant Professor in this Department, is leaving now to become Associate Professor of Physiology. His contributions to the Department of Pharmacology have been substantial. We are happy that he is not moving far and that we may expect to enjoy some collaboration with him in the future.

RESEARCH

Dr. Ferguson and Dr. Sellers have continued their investigations on the actions of drugs on the thyroid gland. They have found that the administration of small amounts of iodide with thiouracil does not interfere with the desirable action of thiouracil in depressing the metabolic rate, but does decrease the undesirable action of thiouracil in causing enlargement of the thyroid gland.

Dr. Sellers has collaborated with Dr. Gornall and Mr. Barlow of the Department of Pathological Chemistry, in further work on control of uraemia by perfusion of the intestinal tract.

Dr. Lucas has continued his studies on the recovery of strychnine from the liver of animals poisoned with the drug. The work is approaching a satisfactory conclusion and promises to be an important contribution to the methods of toxicological analysis.

Dr. Lucas has also investigated, at the request of the Department of Health, Ottawa, methods of detecting and identifying new narcotic drugs which have caused concern to those charged with the administration of the Narcotic Drug Act. This work has met with gratifying success.

Mr. W. Paul has developed a much-improved instrument for the measurement of the oxygen saturation of arterial blood. He has collaborated with the Departments of Medicine and Surgery, and with the Institute of Aviation Medicine, in various investigations which involved photoelectric oximetry. Finally, he has rounded out a creditable formulation of a theory of inhomogeneity of air in the lungs.

Mr. H. W. Smith has completed a three-year study on the measurement of alcohol in biological fluids.

Dr. W. R. Bonney has studied the reactions of rat and guinea-pig uterus in different stages of the life cycle, with a view to discovering when differentiation of reaction to drugs develops in these species. It is too soon to generalize on his findings.

Dr. K. W. G. Brown has studied the effect of glucose on the toxicity of digitalis glycosides. Glucose has been reported as decreasing the toxicity of digitalis in cats but the effect is not apparent in other species.

Dr. D. M. Finlayson, working with Dr. Hilliard at the Toronto Western Hospital, has applied the photoelectric oximeter to the problem of assessing pulmonary function. Several useful procedures have been evolved.

Dr. Shirley Fleming has studied the effects of repeated intravenous injection of procaine into animals with a view to assessing the safety of this procedure in humans for anaesthetic purposes. She has also analysed some of the features of the peculiar action of procaine as a general anaesthetic.

Dr. H. S. Hamilton has studied the potency and toxicity of a number of local anaesthetics and has improved considerably on the methods of expressing information of that kind.

Dr. D. E. Hutcheon has developed and compared two methods of assay of the activity of the thyroid hormone and in this process has disclosed a new action of the hormone meriting further investigation. He has also continued his studies on the cause of abrupt cardiac death under chloroform and cyclopropane anaesthesia. There seems to be a useful distinction between the action of chloroform and cyclopropane in that the latter is more dangerous in deep anaesthesia while the former is more dangerous at lighter stages.

Mr. L. A. O. Roadhouse has continued his studies on the toxicity of insecticides, for mammals, with the object of evolving a more systematic way to evaluate the safety of these substances.

PUBLICATIONS

- BONNYCASTLE, D. D. "Repeated determinations of plasma volume, blood volume and total available fluid in a group of normal trained dogs" (*American Journal of Physiology*, vol. 151, 1947, pp. 504-8).
- CLARKE, A. P. W., CLEGHORN, R. A., FERGUSON, J. K. W. and FOWLER, J. L. A. "Factors concerned in the circulatory failure of adrenal insufficiency" (*Journal of Clinical Investigation*, vol. 26, 1947, pp. 359-63).
- ROGERS, J. W., SELLERS, E. A. and GORNALL, A. G. "Intestinal perfusion in the treatment of uremia" (*Science*, vol. 106, 1947, p. 108).
- SKINNER, H. G. and YOUNG, D. M. "A mouse assay for curare" (*Journal of Pharmacology and Experimental Therapeutics*, vol. 91, 1947, pp. 144-6).
- SMITH, H. W. "A comparison of racemic and levo glyceroguaiacol ethers for anesthetic and other actions" (*Journal of Pharmacology and Experimental Therapeutics*, vol. 91, 1947, pp. 93-7).

Physiology

Under the direction of Professor C. H. Best

The teaching load of the Department continues to increase and presents many difficult problems for the scientific and technical staff. The maintenance of apparatus for student use requires a great deal of time from mechanics and laboratory attendants. Some curtailment of practical work for other than medical and dental students may have to be recommended.

Professor N. B. Taylor has decided to resign from the Department on June 30 of this year, although he is still a few years short of the retiring age. His resignation has been accepted with regret, and his many contributions to the Department are acknowledged with gratitude.

Dr. Edward A. Sellers, who has been Assistant Professor of Pharmacology, is being appointed Associate Professor of Physiology and will take over the teaching duties which have been carried by Professor Taylor. The members of the staff also regret the departure of Professor E. T. Waters, whose brilliant contribution to the Department over nearly seventeen years is gratefully recorded. Professor Waters leaves to join the staff of the Department of Physiology in his Alma Mater, The University of Wales at Cardiff.

The Physiological Society of the University of Toronto enjoyed another successful year. Twenty-one meetings were held on Mondays during the academic session. There were several distinguished visitors among the list of speakers—Sir Henry Dale spoke on "The Physiological Significance of Histamine," Professor Christian de Duve of Louvain on "The Hyperglycaemic Factor of the Pancreas," and Professor Ernst Rothlin of Basle on "The Fate of the Ergot Alkaloids." Dr. Tage Astrup of the Carlsberg Foundation in Copenhagen gave a series of lectures on the coagulation of blood and on tissue culture.

RESEARCH

Dr. D. Y. Solandt and the members of his biophysical group have been concerned with the investigation of function in denervated and normal skeletal muscle, the electrical activity of the myocardium, the evaluation and cerebral localization of the olfactory sense and the effect on the animal body of exposure to low temperatures produced by immersing parts of the body in cold water. Dr. G. W. Pruetter has investigated the electrical activity of the septal musculature of the heart and its contribution to the typical electrocardiogram. Dr. J. D. McQueen has developed a method for obtaining a cortical response from rats as a result of olfactory stimulation and is undertaking experiments in which it is hoped, through the use of special stereotactic equipment, to record cerebral action potentials resulting from olfactory stimulation in these animals. Mr. M. L. Bunker is continuing the investigation of specific histological changes in surface tissues, in muscle and nerve and in various organs in the animal body, resulting from immersion. Mr. G. K. Roseblade has constructed electromyographic equipment, a portable air sampling unit, and is at present engaged in the construction of a cylindrical-cell turbidimeter of unique design. He is collaborating in the construction of a radar-type microwave radiator and doppler-effect timer to be used for the investigation of the electrical changes in the deep musculature of the heart. The design of these devices has been evolved in collaboration with the head of the section, and the microwave equipment, a joint project with the Department of Physiological Hygiene, owes many of its features to Messrs. T. Cranston and J. E. Hogarth.

Dr. R. E. Haist and his colleagues have developed a method for the estimation of the volume of the islets of Langerhans. A comprehensive study is being made of factors influencing islet volume.

Mrs. M. A. Evans is investigating the effects of insulin injections over long periods of time. Dr. F. E. Bryans is studying the influence of hypophysectomy and of injections of anterior pituitary extracts on islet volume. Mr. B. Kinash is attempting to find the effects of partial pancreatectomy and, with Dr. M. A. Ashworth, the results of injections of glucose. Dr. Ashworth is continuing his experiments on the blood flow to the liver and pancreas in relation to carbohydrate metabolism. Mr. J. S. Speakman is attempting to develop a method for the estimation of the adrenocorticotrophic factor in urine. A good measure of success has been secured in all these projects.

Dr. E. T. Waters, with Dr. E. Fidler and Dr. J. B. Firstbrook, has continued work on anaphylactic shock in dogs, with particular attention to the effect of dicumarol. When the shocking dose of antigen was given some four to six days after a large dose of dicumarol, and thus at a time when the prothrombin time was considerably prolonged, about half the number of dogs so treated failed to show any change in blood pressure. Sometimes there was the usual profound decrease in

blood platelets. Of those dogs which showed the usual precipitate and marked fall in blood pressure, some showed no appreciable decrease in the platelet count. This lack of a pronounced decrease in platelets was not observed in sensitized dogs, untreated with dicumarol. The way in which dicumarol modifies the responses of the sensitized animal to an injection of the antigen is not yet apparent.

With Mr. G. Balasubramanyam, Dr. Waters has obtained evidence from experiments on rat liver slices that the hyperglycaemic material present in some samples of insulin not only breaks down glycogen but increases the rate of sugar formation from non-carbohydrate sources.

Professor J. Markowitz, with the collaboration of Dr. J. F. Murray and Dr. L. S. Davies, has continued his studies of the function of the hepatic artery. It is well known that ligation of the hepatic artery beyond its last tributary is always fatal. Increasing the volume of venous blood flow had no favourable effect, but in one experiment in which arterial blood was made to flow through the portal vein, some extension of life was secured after ligating the hepatic artery. Difficulties with the formation of thrombi have been encountered, and experiments are continuing in the effort to solve these problems.

Dr. J. Campbell has studied the metabolism of the liver and its rate of utilization of fatty acids by the Warburg technique of suspending liver slices in a saline medium. The rate of utilization of fatty acids is determined by measuring the production of ketone bodies. Anterior pituitary extracts increase the ketone body content of the blood and urine in normal rats. It was found that the addition of the extract directly to the medium increased the ketone body production of the liver slices and the oxygen uptake. The effect was slight, however, and to relate it to the intact organism, rats were pretreated with the pituitary extract. This caused a considerable increase in the fat content of the liver and an increase in ketone body production of the liver *in vitro*.

Mr. D. W. Snair has continued his studies on the nature of the diabetogenic substance of the anterior pituitary gland. He has also co-operated with other groups (Dr. A. W. Ham and Dr. R. E. Haist) by preparing various pituitary extracts for their experiments.

Dr. D. C. Smith and Mr. Snair have investigated the problem of developing a suitable method for the assay of the diabetogenic substance of the anterior pituitary gland. They have studied the responses of various species of animals to extracts which are active in producing a diabetic state in previously normal dogs. This work is still in progress.

The work on heparin in collaboration with Dr. L. B. Jaques mentioned in last year's report was continued during the year. The injection of certain samples of purified heparin into dogs causes a transient thrombocytopenia. The lowest counts appeared within 2½ to 5 minutes after intravenous injection and in four animals reached a level of less than 10 per cent of the number before injection. Continuous injection at 1 unit/kg./min. held the platelet count down, though not at the low point reached by a single injection. Agglutination of the platelets appeared in all samples taken 2½ minutes to more than 1 hour after injection and on the whole appeared greater with the early low counts than with later ones. Whether this effect is due to an impurity or is a property of purified heparin is the subject of study in work with Dr. A. M. Fisher and Dr. A. F. Charles of the Connaught Laboratories.

Dr. E. S. Goranson and Miss D. H. Stock have studied the phosphorylation of creatine in homogenates of brain, kidney and heart muscle of the rat, incubated for short periods at 37° C. The results show that in the presence of added succinate cytochrome C and adenosine triphosphate, the synthesis of phosphocreatine in preparations from alloxanized rats is significantly less than in those from normal animals. Insulin added to the homogenates from alloxanized rats did not augment phosphocreatine synthesis. Insulin injected into the alloxanized rats prior to tissue sampling was found to promote an increased formation of phosphocreatine. When an excess of potassium was added to the homogenates, the difference in phospho-

creatine synthesis between alloxanized and normal rat tissues was negligible. The results may signify a participation of insulin in oxidative phosphorylations in the tricarboxylic acid cycle.

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Psychiatry

Under the direction of Professor A. B. Stokes

General. Good clinical instruction in psychiatry, as with other branches of medicine, depends on a sufficiency of teachers of the proper calibre and a representative clinical material. The teaching strength of the Department of Psychiatry needs considerable augmentation: the clinical material is limited to the administratively urgent problems of an acute reception hospital and an out-patient service linked too closely with the processes of certification and commitment.

The effect of two major weaknesses on psychiatric education cannot be overestimated. The student has little if any contact with the problems which will later confront him in such important fields of mental health as child psychiatry, psychosomatic disabilities, neurotic illnesses, or vocational breakdowns. His knowledge of the available techniques of investigation is likely to be very limited: his application of treatment methods will not include such powerful therapeutic weapons as systematic psychotherapy or social adjustment in its material and human aspects.

The situation is analogous to that which would occur in general medicine if the student educational programme omitted large fields of clinical experience, e.g. nutritional or endocrine disabilities. The detriment would be greater than the mere loss of his personal efficiency as a practitioner: his initial unawareness of the missing field would both deny his contribution to it and prejudice his reception of the contributions of others.

During the year 1947-48 an effort has been made, within the limitations allowed by circumstances, to sharpen interest in the less florid forms of psychiatric disability. A children's clinic has been organized, psychosomatic conferences have been held, psychotherapy of both individual and group kind has been developed and specific vocational readjustment problems have been studied. Much further expansion in these fields is required but attainment will depend on a re-evaluation of the educational needs of the university Department alongside the service needs of the Hospital.

Administrative. An academic council has been set up by the Medical Faculty for the department of psychiatry to promote the educational development of psychiatry within the general medical framework. The constitution of the academic council ensures a less alienated psychiatric organization with criticism and stimulation from outside the specialty, and a continuous attention to the training facilities and teaching programmes. The academic council, as an advisory body to the University, will serve a powerful function when a means of translating its advice into action has been devised.

Undergraduate education. The objective of undergraduate teaching in psychiatry has been to provide a working appreciation of the mental aspects of illness

and to promote a practical therapeutic approach. It is assumed that the medical status at graduation should comprise a broad knowledge of illness and that psychiatry should be as generally represented in that body of knowledge as any other specialty—say paediatrics. Tuition is given in all four medical years but the large number of students in the first three medical years precludes any direct contact between student and patient. Even in the fourth year the student at most will examine but two patients himself.

Arrangements have been made to lessen the difficulties. First, the examination in psychiatry will be placed at the end of the fourth year: this will give emphasis to the clinical work of the final year. Secondly, the lectures of the second and third years have been freely illustrated by case demonstrations. Although the vicarious examination of a patient by the lecturer is no substitute for personal examination, the demonstrations to emphasize that psychiatry is concerned with vitally important health problems.

The total number of hours devoted to psychiatry in the undergraduate curriculum is 83. The technique of organizing this student time into practical experience with patients requires overhaul.

Postgraduate education. The objective of postgraduate psychiatric training is the attainment of proper specialist status. To that end a beginning has been made in the organization of a four-year period of training after requisite internships. The full development of the project will require association with other hospital centres, with community services, and with industry. A preliminary liaison has been established with the Neuropsychiatric service at the Sunnybrook Hospital and with the Hospital for Sick Children. The financial support of the overall training plan becomes a crucial consideration.

Nine physicians with prerequisite experience have been attached to the Department over the year for postgraduate training. Six have been seconded from the Ontario Hospital Service and three have registered directly. In addition one physician has completed a second year of training and one a third year.

The experience offered to the postgraduates includes the fields of Neuropathology, Neurophysiology, Neurology, Child Development, Clinical Psychology and Social Medicine. With the development of a longer term of training less condensation in these and related subjects will be possible with all the advantages of a more thoughtful approach. The present programme has been carried through by the whole-hearted co-operation of other university departments.

The registration with the University for postgraduate training has been placed on an orderly footing: a subsistence payment is allowed by the Department of Health to trainees not members of the Ontario Hospital Service. These two items will encourage doctors of the proper calibre to seek specialist education in psychiatry.

There will be seven candidates for the diploma in Psychiatry in the September examination. Dr. C. H. McCuaig, Professor of Psychiatry, Queen's University, has been appointed external examiner.

Education in ancillary psychiatric fields. The Department has continued to exert an active educational function in the ancillary fields of Nursing, Occupational Therapy, Social Work and Clinical Psychology. In each division both undergraduate and graduate training programmes have been organized along essentially practical lines. Much further development is anticipated to meet the urgent needs of trained personnel.

University Health Service. The Department of Psychiatry has co-operated with the University Health Service in providing open facilities to students for psychiatric consultation and treatment. As circumstances permit an increasing stress will be laid on prevention and a positive mental health programme.

Graduate Bursary Fund in Psychiatry of the Medical Alumni Association. The executive committee of the Medical Alumni Association has set up a "Graduate Bursary Fund in Psychiatry." From the fund awards will be made from time to time to postgraduate physicians requiring assistance in their psychiatric training.

Conclusion. Some progress has been made in setting up the Department of Psychiatry as a centre of liberal psychiatric education, properly linked on the one hand to physical medicine and on the other to the social sciences. For a full development several crucial issues arise.

(a) the substitution of a "closed" system of staff appointments by an "open" system.

(b) the "open" registration of postgraduate students of the proper calibre.

(c) the provision of an overall clinical material by expansion or association.

(d) the financing of such developments considered is long term.

(e) the fostering of research projects without regard to immediate utilitarian gains.

RESEARCH

Research in psychiatry, as in other fields, requires interest, thought, time and money. During the current academic year no research appointments, part time or full time, have been made in the Department. No financial provision has been made for research investigations.

Items of clinical inquiry have been taken up by the working staff. Dr. J. G. Dewan has completed an investigation into the relationship of mental retardation and personality instability under conditions of military service. Dr. M. V. Jackson is undertaking an inquiry into the causes of fever as seen in mentally disturbed patients without physical disease. Dr. G. H. Lugsdin and Mr. J. E. Goodwin are seeking a possible relationship between successful electrical convulsive therapy and cortical electrical patterns as recorded by the electroencephalograph. Mr. Goodwin has pursued his neurophysiological studies in the clinical significance of alpha variants found in electroencephalograph records. Dr. A. M. Hood and Dr. A. C. Church are collecting cases which show the incidence of spontaneous epilepsy as a complication of prolonged electrical convulsive therapy. Dr. Lugsdin and Dr. R. McQueen are investigating an unusual case of schizophrenia, subjected to insulin shock therapy, where blood sugar values of 9 to 30 mgms per cent have been obtained consistently without deep coma. Dr. E. J. Rosen is inquiring into the social, personal and physical factors responsible for the development of homosexuality. Dr. Church is investigating group mechanisms as factors in the production or alleviation of functional symptoms. Dr. C. R. Myers and Mr. H. O. Steer, from the Department of Psychology, are seeking a relationship between performance on a battery of psychometric tests and prognostic outcome in a group of schizophrenics subjected to insulin shock therapy. Dr. G. C. Beacock, in association with the Department of Surgery, is investigating the clinical criteria associated with good prognosis in a group of patients submitted to prefrontal leucotomy.

PUBLICATIONS

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STOKES, A. B. *The anatomy of psychiatry*. McGhie memorial lecture. London: University of Western Ontario. Jan., 1948.

Surgery

Under the direction of Professor R. M. Janes

During this year the fundamental principles established by Professor W. E. Gallie have been perpetuated. An attempt has been made to obtain greater co-ordination of undergraduate teaching so that in the three clinical years a reasonably complete coverage of the broad principles of surgery could be assured. Increasing emphasis is being placed upon the separation of undergraduate from postgraduate teaching. Undergraduate teaching is concerned with surgical diagnosis and the acquisition of a knowledge of indications for surgical therapy and the results that may be expected from surgical intervention rather than the particular methods to be employed.

An attempt has been made to weld the four university hospitals into a great teaching unit. Ward rounds have been conducted by the head of the department one week each month at St. Michael's Hospital and the Western Hospital in addition to the regular rounds at the General Hospital. Arrangements have been made whereby the final year students visit the Toronto Hospital for Tuberculosis two days each term in order that they may see the work being done in the surgical treatment of pulmonary tuberculosis under the direction of Doctor F. G. Kergin, in bone and joint tuberculosis under the direction of Doctor R. I. Harris and in genito-urinary tuberculosis under the direction of Doctor J. C. McClelland. This teaching has been under the immediate direction of Doctor Hugh Coulthard and its value has been endorsed enthusiastically by the students.

Surgical pathological conferences have been conducted every fourth Wednesday of the month, from 8.30 a.m. to 9.30 a.m., by Professor William Boyd in the Banting Institute. They are attended by the surgical staff and as many as possible of the senior resident staffs of all the hospitals. These conferences have proved most stimulating and the surgical staff feels much indebted to Professor Boyd and his staff for the great amount of work that has gone into the preparation of material. It has proved to be another valuable contact between the staffs of the various hospitals. In addition to these, monthly conferences on orthopaedic material have been arranged by Professor Boyd and Doctor R. I. Harris. These also are proving to be popular and are well attended.

Postgraduate teaching is occupying an increasingly important place. The four university hospitals are functioning as a unit in this scheme so that the men may be rotated freely between the various hospitals in such a manner as will assure them a broad training in surgery and the surgical specialties. The D.V.A. hospitals at Christie Street and Sunnybrook have joined the scheme this year and the head of the Department has assumed responsibility for providing these hospitals with a constant flow of residents of a high calibre. In addition, the Toronto East General Hospital, the Toronto Hospital for Tuberculosis and the Mountain Sanatorium at Hamilton are being utilized. About fifty men are at present receiving training in surgery under this scheme. The practice of assigning men to the basic science departments for a year before they enter upon their surgical training is being continued. The Department of Surgery is grateful to the heads of the various basic science departments for their co-operation and assistance in this scheme of training. A course of lectures in physiology has been given under the direction of Professor Best; facilities for the review of anatomy have been provided by Professor Grant; and a series of lectures on surgical subjects presented by members of the Department of Surgery. Clinical assistantships have been arranged in Urology, Neurosurgery and Orthopaedics for the purpose of completing the training of a small number of men in these surgical specialties.

A refresher course for those seeking fellowship or certification in the Royal College of Surgeons of Canada was given during September and October, 1947. It was attended by nineteen men and seemed to receive the approval of those who took advantage of it.

The curriculum in surgery in the Faculty of Dentistry has been reorganized during the year. Dental students now attend the Toronto General Hospital on the same basis as medical students. The main teaching is still done by Doctor Jessie Gray but in addition special lectures and clinics are given by Doctor Harold Wookey and Doctor Stuart Gordon of the Department of Surgery, Doctor Clifford Ash of the Department of Radiology and Doctor Tanner of the Faculty of Dentistry.

Dr. Gallie became Professor Emeritus. Dr. Gordon Murray was promoted to the rank of Assistant Professor in charge of a division at the Toronto General Hospital. Dr. C. S. Day, Dr. D. A. Duckworth, Dr. S. R. Lowrey and Dr. W. D. Smith have been appointed to the staff of the university and St. Michael's Hospital. Dr. H. S. Coulthard of the Toronto Hospital for Tuberculosis has received a university appointment.

It is with profound regret that I record the death of Dr. Roscoe Graham on January 17, 1948. In his passing the university has lost a great teacher and the Toronto General Hospital a surgeon of unusual merit. Dr. F. I. Lewis has succeeded him in charge of the first division of surgery at the Toronto General Hospital and has been promoted to the rank of Assistant Professor.

Dr. Norman Delarue spent the last year on a travelling fellowship in the United States. Most of his time was spent in the clinic of Dr. Evarts Graham of St. Louis, but on the completion of his time there short visits were made to a number of the outstanding clinics in the country.

Dr. Edouard Gagnon completed his training and returned to Montreal to join the staff of the Hôtel Dieu Hospital and the University of Montreal. Drs. Cooper and Lane began practice in Hamilton on completion of training and Dr. Howes in Peterborough. Dr. Outerbridge returned to the University of West China. Dr. Paul McGoey was appointed a fellow at St. Michael's Hospital.

The 1947 Donald C. Balfour lecture was delivered by D. J. Trueta, M.D. Barcelona, D.Sc. (*Hon. Causa*) Oxon., F.R.C.S.(C.) Hon., on December 1, 1947, on "The Renal Circulation and its Pathology." This address was heard by a large and highly appreciative audience.

Among the honours that have come to the members of the Department during the year are the following:

Dr. W. E. Gallie was awarded the Honorary Medal of the Royal College of Surgeons of England on September 22, 1947, and on September 24 delivered a Moynihan Lecture. On May 25, 1948, he was given the degree of D.Sc. from McGill University. On the death of Dr. Elliot Cutler in Boston, Dr. Gallie became President of the American Surgical Association. On the occasion of his retirement from the chair of surgery he was presented with a portrait by Mr. Cleeve Horne and a typescript volume of some fifty essays on surgical subjects written by his colleagues and former students. This volume will be available in printed form for general distribution some time in the new year.

Dr. Harold Wookey delivered the Hunterian Lecture in September, 1947, on "The Surgical Treatment of Carcinoma of the Oesophagus." Dr. R. I. Harris is President of the American Orthopaedic Association. The Head of the Department was made an Honorary Member of the newly formed British Columbia Surgical Society and acted as guest speaker at the meeting in Vancouver in March.

The Lister Prize was divided between Drs. Gagnon and Lane, both of whom passed the Master of Surgery examinations with distinction.

The George Armstrong Peters Prize was awarded to Dr. Bruce Tovee for his work with Dr. Dragstedt on the pathological physiology of peptic ulcer.

On this occasion, at the conclusion of the first year as head of the Department, it is a pleasure to express my sincere appreciation for the loyal support that has been received from my associates in surgery, the help given on frequent occasions by members of the other departments and the assistance of Miss Tanis MacLaren, secretary to the Department. Without their co-operation the accomplishments of this

year would not have been possible. Finally, I should like to extend an invitation to our graduates to the wards and operating rooms of the hospitals where they shall be welcome at all times.

RESEARCH

A considerable amount of research work has been undertaken in the Department during the past year.

The following investigations have been undertaken:

- ABERHART, C. Modified "T-tube" for ureteral lesions; a new male rubber urinal.
- BIGELOW, W. G. Vascular studies in trauma with particular reference to the occurrence of "sludging" in capillary circulation; metabolic studies in refrigeration; blood volume studies, pre- and post-operative (clinical); venogram studies of the post-phlebotic leg (clinical).
- BOTTERELL, E. H. Continuing study of methods of relieving reflex spasms in paraplegic patients; the pathogenesis and treatment of pain of central origin in spinal cord injuries; the establishment of the technique of cerebral angiography with a view to improving surgical treatment of intracranial vascular lesions and tumours; a follow-up study of D.V.A. patients following operation for herniated disc.
- COULTHARD, H. S. Review of end results of thoracoplasties performed at the Toronto Hospital for Tuberculosis since 1933.
- DEWAR, F. P. Clinical research problem in "scoliosis." An attempt to estimate the number of persons in the general population suffering from scoliosis by viewing thirty thousand miniature chest films.
- GORDON, S. D. A study of metaplasia in bone transplantation; a study of the fate of the subcutaneous transplantation of skin; a study of the effect of hyaluronidase on the plasmatic circulation of free skin grafts.
- HARRIS, R. I. The designing of an air-pressure tourniquet suitable for operations on the lower extremities.
- KERGIN, F. G. Investigation of anoxic anoxia occurring during thoracic operations; clinical investigation and follow-up of bronchiectasis with special reference to bilateral disease.
- MCCLELLAND, J. C., in conjunction with Professor P. H. Greey of the Department of Bacteriology and the staff of the Toronto Hospital for Tuberculosis. An investigation into the use of streptomycin and para-aminosalicylic acid in the treatment of renal tuberculosis. No results can be reported as yet.
- McKENZIE, K. G. Clinical research and follow-up of a group of hypertensive patients operated on by the Smithwick technique.
- MUSTARD, W. T. Experimental surgery of the heart.
- SPOONER, C. M. Modification of the Millin needle in retropubic surgery.
- TOVEE, E. B. Clinical research in perforated duodenal ulcers—some 150 cases in the process of follow-up; clinical research with Dr. K. J. R. Wightman, of the Department of Medicine in the investigation of fat metabolism in gastrojejunocolic fistula.

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- BOTTERELL, E. H. "Brain injuries and complications"; in *British surgical practice*, vol. 2, S. Key 74, pp. 349-84. London: Butterworth. 1947.
- BOTTERELL, E. H. and STEWART, O. W. "Cranio-facial-orbital wounds involving paranasal sinuses: Primary definitive surgical treatment" (*British Journal of Surgery, War Surgery Supplement*, no. 1, 1947, pp. 112-18).
- DELARUE, N. C. "Traumatic unconsciousness" (*Canadian Medical Association Journal*, vol. 58, May, 1948, pp. 457-65).
- DEWAR, F. P. "Fractures of the hand" (*Bulletin of the Academy of Medicine, Toronto*, no. 6, March, 1948, pp. 112-16).
- GALLIE, W. E. and LEMESURIER, A. B. "Recurring dislocation of the shoulder" (*Journal of Bone and Joint Surgery*, vol. 30B, Feb., 1948, pp. 9-18).
- GORDON, S. D. "Fractures of the mandible: Aetiology and diagnosis" (Department of Veterans Affairs, *Treatment Services Bulletin*, vol. 2, Oct., 1947, pp. 5-8).
- "Fractures of the mandible: Treatment and general considerations" (Department of Veterans Affairs, *Treatment Services Bulletin*, vol. 2, Dec., 1947, pp. 5-10).
- "Interosseous wiring in the treatment of fractures of the mandible" (*Archives of Surgery*, vol. 55, Dec., 1947, pp. 660-7).
- "Surgical treatment of pressure sores" (*Plastic and Reconstructive Surgery*, vol. 2, Nov., 1947, pp. 557-62).

- GORDON, S. D. and WARREN, R. F. "Homogenous fetal cartilage graft to bone" (*Annals of Surgery*, vol. 127, Jan., 1948, pp. 90-7).
- HARRIS, R. I. and BEATH, T. *Army foot survey*. Ottawa: National Research Council. 1947. Pp. 400.
- "Hypermobility flat-foot with short tendo achillis" (*Journal of Bone and Joint Surgery*, vol. 30A, Jan., 1948, pp. 116-40).
- JANES, R. M. "Lipoid pneumonia simulating carcinoma" (*Journal of Thoracic Surgery*, vol. 16, no. 5, Oct., 1947, pp. 451-7).
- LAIRD, R. C. "Bronchiectasis in service personnel" (*Journal of Thoracic Surgery*, vol. 17, Feb., 1948, pp. 57-61).
- MUSTARD, W. T. "Operation for closure of patent ductus arteriosus" (*Canadian Medical Association Journal*, vol. 57, 1947, pp. 340-1).
- "Orthopaedic care during the convalescent stage of infantile paralysis" (*University of Toronto Medical Journal*, vol. 25, March, 1948, pp. 163-5).
- TOVEE, E. B. "Vagotomy" (*University of Toronto Medical Journal*, vol. 25, Jan., 1948, pp. 108-12).
- WHITE, A. W. M. "Compound fractures" (*Canadian Medical Association Journal*, vol. 58, April, 1948, pp. 334-8).
- WOOKEY, H. W. "Surgical treatment of carcinoma of the hypopharynx and the oesophagus" (*British Journal of Surgery*, vol. 35, no. 139, Jan., 1948, pp. 249-66).

Therapeutics

Under the direction of Professor R. B. Kerr

The teaching in the Department of Therapeutics has continued along the same general plan which has been followed during the past few years. Didactic lectures and theatre clinics in the third medical year comprise the major portion of the teaching. In the fourth medical year practical demonstrations of therapeutic procedures are given to small groups of students.

Dr. J. G. Watt has held the Research Fellowship in Therapeutics for this year.

Dr. W. B. Arnup, Dr. H. G. Kelly and Dr. M. A. Ogryzlo were appointed as Assistants in Therapeutics for the session.

The teaching of Anaesthesia has followed the same plan as in previous years.

The death of Dr. K. M. Heard on April 13, 1948, has removed one of the most valuable members of the teaching staff in Anaesthesia. He held an appointment as Junior Demonstrator and was also on the staff of St. Michael's Hospital for many years. He was active in clinical researches in anaesthesia, and was the author of many scientific articles in the field of anaesthesia. He was a Past President of the Canadian Anaesthetists' Society. At all times he contributed his knowledge and ability to the teaching of students.

Dr. W. H. Butt and Dr. J. A. Vining were appointed as Voluntary Assistants in Anaesthesia.

A postgraduate course in Anaesthesia has been organized to consist of two years of training. The major portion of this course consists of practical experience in hospitals in Toronto including Christie Street Hospital. In addition to the practical training there is a series of lectures, demonstrations or seminars conducted in Physiology, Anatomy, Pharmacology, Pathological Chemistry and Bronchoscopy through the generous co-operation of the staffs of the departments concerned. Lectures are also given by members of the staff in Anaesthesia on various aspects of anaesthesia. This course was begun in July, 1947, and there have been eleven postgraduate students registered in the course during this past year.

No change has been made in the staff, and the teaching has followed that of previous years.

RESEARCH

Dr. J. G. Watt has studied the urinary excretion of folic acid in cases of pernicious anaemia and other types of macrocytic anaemia before and during therapy with liver extract. The finding of abnormally low values for folic acid excretion in untreated cases was confirmed. Following therapy a small number of patients

showed an increased excretion of folic acid but the majority showed no increase. The reason for this difference is not clear and requires further elucidation. Because of this variation it has been concluded that this procedure would be of no value in assessment of the efficacy of a given liver extract. The work was carried out as a co-operative study with the Department of Public Health Nutrition in the School of Hygiene, in co-operation with Dr. E. W. McHenry.

Dr. A. H. Squires has been investigating the effect of thyroid extract administration to normal and obese individuals over prolonged periods of time.

Dr. Shirley Fleming has been studying the therapeutic uses of intravenous procaine in the Department of Pharmacy and Pharmacology with Professor J. K. W. Ferguson.

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GARDINER, W. J. "After care, methods and value of massage"; in *British encyclopaedia of surgical practice*. London: Butterworth.

VINING, J. A. "Supportive treatment during anaesthesia" (*Canadian Medical Association Journal*, vol. 57, Nov., 1947, pp. 479-84).

VINING, J. A. and SMITH, C. "Combined curare, pentothal and nitrous oxide technique" (*Bulletin of the Academy of Medicine*, Toronto, Dec., 1947).

Banting and Best Department of Medical Research

Under the direction of Professor C. H. Best

The research activities of the Department have been directed mainly along the following lines: insulin and carbohydrate metabolism; choline, fatty livers and cirrhosis; heparin, blood clotting and thrombosis; the cholinesterases; the problems of carcinogenesis; the synthesis of new compounds of physiological and biochemical interest. Chemical, histological and physiological approaches of various kinds have been made in these investigations. Guest research workers from Australia, Brazil, Chile, Denmark, Holland, India, the United States and from almost all the provinces of Canada, have been conducting postgraduate studies in the Department.

During July, August and September, 1947, the Head of the Department gave some twenty lectures on insulin, choline, heparin and histamine in London, Oxford, Cambridge, Brussels, Louvain, Liege, Amsterdam, Leiden, Copenhagen and Oslo. More recently he has lectured at the Academy of Medicine and the Academy of Science in New York, in Boston, Cleveland, Washington, Houston, Galveston, Indianapolis and Chicago. These eighteen lectures in the United States have included the Herbert S. Carter Memorial Lecture at Columbia University, Phi Beta Pi lectureships at Houston and Galveston and four lectures given while a Visiting Professor at Baylor Medical School in Houston. During the year Dr. Rosemary Hawkins and Professor Bruno Mendel delivered a paper before the British Pharmacological Society in London, England. Professor W. R. Franks and his colleagues presented their findings at the International Cancer Conference held in St. Louis, Professor C. C. Lucas addressed the Annual Conference of the Chemical Institute of Canada, in Montreal, Professor H. O. L. Fischer presented a paper during the celebration of the fiftieth Anniversary of the American Chemical Society at Ohio State University and Dr. W. S. Hartroft gave demonstrations at the International Congress of Pediatricians in New York and at the New York Academy of Medicine.

Choline is the chief member of a group of dietary factors known as "the lipotropic agents," the absence of which leads to the development of large fatty livers and cirrhosis. The literature on the lipotropic agents, which were discovered in our University, continues to grow and now on a yearly basis it equals in volume that on insulin. As pointed out previously, there is little immediate practical application of the work on choline in this country but groups of scientists from South Africa and India where large numbers of people suffer from what now appears to be, in part, a lack of choline, have come to Toronto to study the work which is going on here.

Professor Lucas has spent his whole time this year studying the interrelationships of the individual members of the group of dietary factors known collectively as the lipotropic agents. The principal precursor of choline in the body is the sulphur containing amino acid, methionine, which is one of the essential building stones of protein. Dr. Lucas has obtained new data to show that the requirement for this essential substance is far greater in young animals than in older ones. The amount needed depends upon the amount of choline in the diet. Miss Jessie Lang has applied and developed accurate methods of assay for methionine and for the amino acid, serine, which also plays a role in the protection of liver tissue.

Dr. Jessie Ridout has been mainly responsible for the direction of most of the routine analytical work on the fat content of livers and of other tissues. During the last year this work has involved approximately twenty thousand determinations of fat content. Dr. Ridout has continued her studies of certain phases of cholesterol metabolism in relation to the action of choline and its precursors.

Miss Oriana Josseau, a postgraduate student from the University of Chile, has worked throughout the past year with Dr. Lucas and they have secured a great deal of interesting information on a new phosphorus-containing fat the presence of which, in liver tissue, had not been established previously. Work of this type proceeds slowly but the results are beginning to repay the investigators for their expenditure of time and energy.

Professor C. S. McArthur has continued the studies of tri-ethyl homologue of choline. This compound prevents the development of the lesions in the liver and kidney just as choline does but it does not accelerate growth. It would appear that choline accomplishes this third effect through liberation of a chemical grouping which is not labile in the tri-ethyl homologue.

Mrs. T. van Noordwijk from Kampen, Holland, has been working with Dr. McArthur on the preparation and properties of sugar-containing fats. A survey of methods which liberate the sugar from its combination with fat, has been carried out.

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Banting Research Foundation
Foster Bequest
Hoffman-LaRoche Incorporated
Ontario Cancer Treatment and Research Foundation
Ontario Research Commission
National Cancer Institute
National Research Council
Nutrition Foundation Incorporated.

RESEARCH

The research activities of the Department have been directed mainly along the following lines: insulin and carbohydrate metabolism; choline, fatty livers and cirrhosis; heparin, blood clotting and thrombosis; the cholinesterases; the problems of carcinogenesis; the synthesis of new compounds of physiological and biochemical interest. Chemical, histological and physiological approaches of various kinds have been made in these investigations. Guest research workers from Australia, Brazil, Chile, Denmark, Holland, India, the United States and from almost all the provinces of Canada, have been conducting postgraduate studies in the Department.

Choline is the chief member of a group of dietary factors known as "the lipotropic agents," the absence of which leads to the development of large fatty livers and cirrhosis. The literature on the lipotropic agents, which were discovered in our University, continues to grow and now on a yearly basis it equals in volume that on insulin. As pointed out previously, there is little immediate practical application of the work on choline in this country but groups of scientists from South Africa and India where large numbers of people suffer from what now appears to be, in part, a lack of choline, have come to Toronto to study the work which is going on here.

Professor Lucas has spent his whole time this year studying the interrelationships of the individual members of the group of dietary factors known collectively as the lipotropic agents. The principal precursor of choline in the body is the sulphur-containing amino acid, methionine, which is one of the essential building stones of protein. Dr. Lucas has obtained new data to show that the requirement for this essential substance is far greater in young animals than in older ones. The amount needed depends upon the amount of choline in the diet. Miss J. Lang has applied and developed accurate methods of assay for methionine and for the amino acid, serine, which also plays a role in the protection of liver tissue.

Dr. Jessie Ridout has been mainly responsible for the direction of most of the routine analytical work on the fat content of livers and of other tissues. During the last year this work has involved approximately twenty thousand determinations of fat content. Dr. Ridout has continued her studies of certain phases of cholesterol metabolism in relation to the action of choline and its precursors.

Miss O. Josseau has worked throughout the past year with Dr. Lucas and they have secured a great deal of interesting information on a new phosphorus-containing fat the presence of which, in liver tissue, had not been established previously. Work of this type proceeds slowly but the results are beginning to repay the investigators for their expenditure of time and energy.

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